SECTION 2
TIER 1 EVALUATION PROCESS AND CRITERIA

2.1 Introduction

The initial inventory of restoration ideas for the Montrose Settlements Restoration Plan encompassed numerous projects, conceptual approaches, and other proposals for use of natural resource restoration funds from the settlement of the Montrose case. Restoration ideas originated from several sources. Some were developed by the Trustees or experts they retained during the damage assessment phase. Some came from brainstorming and discussions in public workshops conducted in 2003. Others were submitted in writing by interested parties during the scoping phase of plan development.

Submissions varied widely in degree of conceptual/ detail development and specificity. Most of the ideas address one of four main categories of resource restoration: bald eagles, peregrine falcons, seabirds, and fishing and fish habitats. Several other ideas did not fit into one these four restoration categories, but instead were ideas for general public outreach and education, or for further data gathering and research. This planning effort focused on the ideas that specifically address the restoration of bald eagles, peregrine falcons, seabirds, and fishing and fish habitats.

The Trustees developed a two-stage process for evaluating and ranking potential restoration actions, referring to the stages as Tier 1 and Tier 2. In the Tier 1 ("screening") stage, the Trustees sort and combine ideas by categories, refine descriptions and gather limited additional information, and evaluate the ideas based upon the criteria described below. The principal objective of the Tier 1 evaluation is to organize, refine and narrow the list of initial ideas within each resource category to a reasonable number of the most promising candidate restoration projects. Following the Tier 1 evaluation, the Trustees perform a detailed ("Tier 2") evaluation of the most promising restoration ideas identified in Tier 1.

2.2 Criteria and Approaches to Assigning Ratings

In Tier 1, the team first considers four factors or criteria:

- Nexus (relationship to the injuries)
- Feasibility (likelihood that potential benefits will be achieved in actuality)
- Benefits to Injured resources or lost services (effectiveness in restoring injured natural resources and lost services identified in the final Montrose consent decree)
- Ecosystem Benefits (degree to which actions result in systemic, sustainable change having broad-scale benefits)

These four criteria were selected for the Tier 1 screening step because they address primary considerations for potential restoration actions.

Each restoration idea is evaluated relative to the other ideas within the same category. Thus, a peregrine falcon project is evaluated against other peregrine falcon projects, but not against bald eagle, seabird, or fishing/ fish habitat projects. Each of these criteria is further described below.

2.2.1 Nexus (relationship to the natural resource injuries that were the subject of the Montrose case)

The strength of a potential restoration project's connection to the injuries of the Montrose case is evaluated by considering both the nature of the proposed action (i.e. does it address resources or services that were injured or lost?) and it's location. For this Tier 1 evaluation, the team rates nexus by considering two sub-factors:

a) The **degree** to which a project's fundamental objective is focused on restoring one or more of the natural resources/ services identified for restoration in the final Montrose case consent decree, which states: "The Trustees will use the damages for restoration of injured natural resources, including bald eagles, peregrine falcons, and other marine birds, fish and the habitats upon which they depend, as well as providing for implementation of restoration projects intended to compensate the public for lost use of natural resources."
b) **Location**. Locations that provide benefits in proximity to where specific natural resource injuries and service losses occur/ occurred (within the Southern California Bight, or "SCB") are given highest ratings. This may not always equate to restoration being located at the immediate sites of injury since contamination is still at issue, but considering the limitations of ongoing contamination, greater value is placed on projects that are as close as feasible to sites of injury/ lost services.

In evaluating each project against this Nexus criterion, the Trustees weigh these sub-factors and reach consensus on a score for each project based on a collective assessment of the sub-factors. The descriptions in the table below are not intended to imply that each project must completely satisfy all sub-factors as described to receive the associated rating. Rather, ratings are assigned according to how each project compares in a relative sense with other projects in its category.

Some further distinctions/ clarifications about Nexus:

- To avoid confusion/ duplication between the *Nexus* criterion and the *Resource Benefits* criterion, the relative effectiveness in restoring injured resources is not considered here, but instead is evaluated under the *Resource Benefits* criterion. Thus two projects could have equal ratings for *Nexus* but different ratings on *Resource Benefits*.
- For the *Nexus* criterion, the seabird category presented a special situation. The Trustees developed a separate seabird-specific set of descriptors for rating seabird restoration ideas under the *Nexus* criterion. They appear below.
- In evaluating the proximity of a project to areas where injuries occur, the physical distance that satisfies a specific rating may vary from one resource category to another.
- Projects that lack specificity about location at this stage (e.g. projects to construct fishing reefs, production reefs, restore wetlands, etc.) are evaluated on an assumption that they will be located as close as possible to where injuries are occurring/ have occurred.
- Projects that are not site-specific physical actions (e.g. public education on fishing for clean fish) are assumed to be addressing injuries/ lost services where they are occurring.

NEXUS CRITERION (Bald eagle, peregrine falcon, and fishing/ fish habitat)

DESCRIPTION	RATING
Project has clear objective of restoring resources injured and/or services lost as a result of Montrose case contamination. Project is located within areas of the SCB that are as close as possible to where the injuries addressed by the project are occurring or have occurred, without being negatively affected by ongoing contamination.	High
Project objective not as clearly linked to resources injured and/or services lost as it is for projects rated high. Project is located within areas of the SCB that are not in close proximity to the locations where the injuries addressed by the project are occurring or have occurred.	Medium
Nexus to injured resources and/or lost services of the case is tenuous. Project is located where it would have little or no effect on the injured resources or lost services at issue, e.g. it is outside of the SCB.	Low

NEXUS CRITERION (Seabird category only)

For the *Nexus* criterion, the seabird category presented a special situation. A large number of restoration ideas benefit one or more species of seabirds. Because data are lacking on the injuries for many seabird species, the Trustee Council adopted an evaluation approach that considers evidence of injury in addition to the nature of the proposed action and its location.

After consideration of the foraging ecology of seabirds in the Southern California Bight, the Trustee Council concluded that it was likely that most, if not all, species of seabirds using the SCB had been exposed to DDTs or PCBs. This exposure either caused documented evidence of adverse injury (specifically eggshell thinning), documented elevated DDT levels in eggs, or there was no documented evidence of injury.

NEXUS CRITERION (Seabird category only)

DESCRIPTION	RATING
Project has clear objective of restoring resources injured and/or services lost as a result of Montrose case contamination. Eggshell thickness for the subject seabird species was determined to be at least 15% reduced when compared to that observed either prior to 1946 or at a control site (as specified in 43 CFR Part II). Project is located within the SCB.	High
Project objective not as clearly linked to resources injured and/or services lost as it is for projects rated high. Eggshell thickness for the subject seabird species was reduced, but not as much as 15% reduced, or there was documentation of elevated levels of DDTs in eggs. Project is located adjacent to the SCB within approximately 200 miles north or south of the SCB (i.e. along the California / Baja California Pacific coast outside of the SCB).	Medium
Nexus to injured resources and/or lost services of the case is tenuous. Seabird species at issue were likely exposed but there is no known evidence of elevated levels of DDTs or injury. Project is located far outside of the SCB.	Low

2.2.2. Feasibility (likelihood that potential benefits will be achieved in actuality)

The feasibility of a project really refers to a number of considerations relating to the likelihood that a project will in actuality be completed and produce the intended results. For the Tier 1 evaluation the Trustees rate feasibility by considering three sub-factors:

a) **Technical issues** (i.e. the practical question of a project's ability to be built/ implemented as envisioned);
b) **Operational/Sustainability issues** (the degree of ongoing operation and maintenance needed to ensure that the project continues to produce the intended results). and,
c) **Regulatory issues** (potential barriers to a project's implementation, e.g. regulatory hurdles, public acceptance);

In evaluating each project against this *Feasibility* criterion, the Trustees weigh these three sub-factors and reach consensus on a score for each project based on a collective assessment. The descriptions in the table below are not intended to imply that each project must completely satisfy all sub-factors as described to receive the associated rating. Rather, ratings are assigned according to how each project compares in a relative sense with other projects in its category.

FEASIBILITY CRITERION

DESCRIPTION	RATING
Project employs proven methods/ techniques that have clearly demonstrated success in the past. Project requires little ongoing operation and maintenance (O&M) once implemented. There are few barriers to implementation.	High
Project employs previously tested methods/ techniques in a new way with reasonable potential for success based on success in other applications. Project has moderate O&M requirements over medium to long term. Barriers to implementation are considered to be moderate.	Medium
Project employs innovative technologies based on experimental trial. Project has demanding long term O&M. There are significant regulatory hurdles or a high degree of institutional resistance to implementing.	Low

2.2.3 Benefits to Injured Resources or Lost Services (effectiveness in restoring injured natural resources and lost services identified in the final Montrose consent decree)

Evaluation of the *Resource Benefits* criterion is isolated from considerations of feasibility or cost. For this criterion, the team considers how effective each project would be, not in general ecological terms, but in terms of restoring the specific injured natural resources and lost services at issue in the Montrose case.

As with *Feasibility*, the *Resource Benefits* criterion requires consideration of sub-factors. For the Tier 1 evaluation, the team will consider the following sub-factors when rating each project:

a) **Duration of benefits**
b) **Are benefits measurable?**
c) **What are the benefits in an absolute sense?**
d) **Conservation status of resources receiving benefits**

As with the *Feasibility* criterion, the Trustees weigh these four sub-factors and reach consensus on a score for each project based on a collective assessment. The descriptions in the table below are not intended to imply that each project must completely satisfy all sub-factors as described to receive the associated rating. Rather, the *Resource Benefits* ratings are assigned according to how each project compares in a relative sense with other projects in its category.

RESOURCE BENEFITS CRITERION

DESCRIPTION	RATING
Provides highly significant benefits to injured resources and/or lost services. Benefits can be readily measured. Benefits occur over a long period of time. Species benefited are of high priority for conservation (applies to seabirds).	High
Provides a moderate level of benefits to injured resources and/or lost services. Benefits can be measured to some degree of reliability. Benefits occur over a moderate period of time. Species benefited are of moderate priority for conservation (applies to seabirds).	Medium
Provides minimal benefit to natural resources and/or lost services. Hard to measure benefits. Benefits occur only over a short period of time. Species benefited are of lower priority for conservation (applies to seabirds).	Low

2.2.4 Ecosystem Benefits (degree to which actions result in systemic, sustainable change having broad-scale benefits)

By design, some projects are narrowly focused on benefiting a particular resource. For example, fish stocking is typically intended to improve the fishing experience of anglers, and not to have broader benefits on fish or fish habitat at an ecosystem level. Under this criterion, the Trustees give the highest rating to those projects that alter conditions in a manner that leads to sustainable improvements in overall function, and a lower rating to those that apply a more limited "fix" in which benefits are generally confined to a particular endpoint.

As with the previous criterion, evaluation of the *Ecosystem Approach* criterion is isolated from considerations of feasibility or cost.

ECOSYSTEM BENEFITS CRITERION

DESCRIPTION	RATING
Project employs an approach to restoration that provides broader, ecosystem-wide benefits, e.g. altering habitats in a manner that provides broader, sustainable improvements.	High
Project primarily benefits injured resource(s), but may also provide modest benefits on a broader scale.	Medium
Project benefits only one species or is narrowly focused on benefiting one type of resource or service.	Low

2.3 Evaluation, Assembling Combined Ratings, and Sorting Ideas

Each restoration idea is evaluated against each criterion and assigned one of the three ratings. The criteria are not weighted. The four ratings for a given restoration idea are then combined into an overall rating (high, medium, or low). The process for combining individual ratings into an overall rating is not quantitative, but is systematic in that projects having a predominance of higher individual ratings receive a higher overall rating, etc. The objective is not to generate an individual rank order of all restoration ideas within each category, but instead to sort the ideas into three strata, those evaluated as "high" overall, as "medium" overall, and as "low" overall. The results of the Tier 1 evaluations for the sorted and refined list of restoration ideas in each of the categories (fishing and fish habitat, bald eagles, peregrine falcons and seabirds) are documented in Section 3 of this Report.

As a final step in Tier 1, the Trustees considered whether certain similar projects that had been evaluated separately might be consolidated for Tier 2 into a single project that combines the best attributes of each.

SECTION 3
TIER 1 EVALUATIONS AND RESULTS

Bald Eagles

MSRP Bald Eagle Restoration Ideas

Tier 1 Results: ***Updated 8/11/04***

#	Bald Eagle Restoration Project Ideas	Nexus	Feasibility	Benefit	Ecosystem Benefit	Total
1.	Restore Bald Eagles on Catalina Island	High	Med	High	Med	High
2.	Restore Bald Eagles on the Northern Channel Islands	High	High	High	Med	High
3.	Restore Bald Eagles on the Mainland	Med	Med	Med	Med	Med

Category: Bald Eagles

Number: 1

Idea: **Restore Bald Eagles on Catalina Island**
Source: 1994 Garcelon Report; Bird Technical Workshop

Summary Description

In 1980, the USFWS and the Institute for Wildlife Studies (IWS), with the cooperation of the California Department of Fish and Game and the Santa Catalina Island Conservancy, initiated an effort to reintroduce bald eagles to Catalina Island. Between 1980 and 1986, 33 eagles were collected from wild nests and released from three different artificial nest or hacking platforms on Catalina Island (Garcelon 1988). Birds are released at around 12 weeks of age. Many of these birds matured and formed breeding pairs on the island. The first eggs were laid in 1987, but broke soon after they were laid.

Since 1989, the reintroduced population has been maintained through manipulations of eggs and chicks at each nest site and through additional hacking of birds. Because of the high DDE concentrations in the eggs, this active manipulation and augmentation is the only way to maintain the Catalina Island bald eagle population at this time. In the egg manipulation process, structurally deficient eggs laid by the birds affected by DDE are replaced with artificial eggs. The adult eagles continue to incubate the artificial eggs while the real eggs are relocated and artificially incubated at the Avian Conservation Center (ACC) at the San Francisco Zoo. Chicks that hatch from these removed eggs, or those produced by captive adults at the ACC or by wild birds, are then fostered back into the nests. Since 1989, 26 chicks have been successfully fostered into nests on Catalina Island and two healthy eggs placed in nests have hatched and the chicks successfully reared. Continued hacking activities have also resulted in the release of an additional 20 eagles since 1991.

In 2004, there were 5 resident bald eagle pairs on Catalina Island, and a sixth pair is anticipated for the 2005 breeding season. This idea suggests continuing the egg and chick manipulation, fostering chicks back onto Catalina, and continued hacking of eagles as needed.

Rating Criteria

Rating: High

1. Nexus

The bald eagle is a priority resource that demonstrated injury from DDT contamination.

✓ Location

Catalina Island is located within the Southern Channel Islands of the Southern California Bight.

Rating: Med

2. Feasibility

✓ Technical issues:

The methodology for maintaining nesting bald eagles on Catalina has been successfully implemented for several years. The specific actions, nest monitoring, egg manipulation and incubation, fostering of chicks, and hacking of new birds are thus feasible from a technical standpoint. However, complete technical success has not been achieved if measured against the goal of restoring self-sustaining bald eagles. The technical constraint that prevents complete success in restoring breeding bald eagles on Catalina is the continued exposures to injurious levels of DDTs.

✓ Operational/Sustainability issues:

Since contaminant exposures have for many years interfered with the Catalina bald eagles' ability to successfully reproduce on their own and contaminant monitoring through time has not provided a clear indication that bald eagles may soon be able to reproduce on their own in this environment. Continuation of this effort would require continued intensive efforts over a long-term period, perhaps for decades. This issue will be considered more closely in Tier 2.

✓ Regulatory issues:

Given that this is an existing effort and is currently operating in compliance with required regulatory approvals, it is feasible from a regulatory standpoint.

Rating: High

3. Benefits to Injured Resources or Lost Services

✓ Duration:

As envisioned, the Catalina bald eagle effort would continue to operate over a period of many years, as long as contaminant exposures continued to interfere with the birds' ability to successfully reproduce. Thus benefits would endure for many years, assuming continued financial support.

✓ Are benefits measurable?

Yes. The ongoing efforts, initiated in the 1980s, have resulted in the establishment and continued maintenance of five breeding pairs of bald eagles that inhabit Catalina Island.

✓ What are the benefits in the absolute sense?

By supporting the ongoing IWS efforts at maintaining bald eagles on Catalina Island despite contaminant exposures that impair their natural reproduction, the MSRP would ensure the continued presence of nesting bald eagles on the island for many more years. It is possible that contaminant exposures may decline at some point in the future to levels that allow the birds to reproduce on their own, and that the Catalina program would serve as a bridge to that point; however, current data do not allow an accurate assessment of when that may occur. Bald eagles fill an important niche in the island's ecosystem. They also provide significant human use and non-use benefits, i.e. the public benefits from the enjoyment of sighting and observing the bald eagles and knowing that they inhabit the island. Research indicates that nesting failures (i.e. laying eggs that do not hatch) over time lead to nest abandonment and breaking of the pair bonding of these birds. Thus it is possible that the discontinuation of the current Catalina efforts could cause pair bonds to break up after some time. While it may be possible for IWS to obtain funding from other sources to support their Catalina bald eagle efforts, it is not certain.

✓ Conservation Status?

The bald eagle population in California is currently included on the List of Threatened and Endangered species. This species is a high priority for restoration efforts.

Rating: Med

4. Ecosystem Benefits

This idea focuses on single-species restoration rather than ecosystem level (e.g. habitat manipulation) restoration; however, since the bald eagle uniquely fills an ecological role as a top-level predator, its presence on Catalina Island conveys broader ecosystem benefits.

Restore Bald Eagles on Catalina Island Total Tier 1 Score: **High**

Category: Bald Eagles **Number: 2**

Idea: **Restore Bald Eagles on the Northern Channel Islands**
Source: 1994 Garcelon Report; Bird Technical Workshop

Summary Description

In 2002 the MSRP initiated a multi-year effort aimed at studying the feasibility study of re-establishing bald eagles on the Northern Channel Islands (NCI). Bald eagles reintroduced to Catalina Island have continued to experience reproductive impairment related to the contaminants of the case. The hypothesis for the NCI study is that these islands are sufficiently far removed from the areas of highest DDT and PCB concentrations that bald eagles inhabiting the NCI may have greater reproductive success than those on Catalina. After public review, the NCI Feasibility Study, along with an Environmental Assessment prepared under the National Environmental Policy Act (NEPA) and State of California Environmental Quality Act (CEQA) was made final in May 2002, and is available for review in the MSRP administrative record. The first set of juvenile bald eagles was hacked onto Santa Cruz Island that same year. Since it takes as many as five years for bald eagles to reach reproductive age, the Trustees anticipate having initial results of breeding attempts around 2008.

This restoration idea carries a presumption that the outcome of the NCI bald eagle feasibility study will affirm the hypothesis that bald eagles nesting on Santa Cruz and neighboring islands will be sufficiently free of contamination that they can successfully produce young without human assistance. Should this be the case, the idea suggests continued active restoration of bald eagles to the NCI through additional hacking and monitoring of bald eagles, with the goal of restoring the number of pairs to the baseline number that inhabited the NCI in the early part of the 20th century.

Rating Criteria

1. Nexus **Rating: High**

The bald eagle is a priority resource that demonstrated injury from DDT contamination.
Bald eagles historically nested on the Northern Channel Islands prior to the releases of the contaminants of the Montrose case.

✓ Location

The Northern Channel Islands lie within the Southern California Bight.

2. Feasibility **Rating: High**

✓ Technical issues:

The process of reintroducing bald eagles to the NCI relies upon proven methods that have already been demonstrated on Catalina and in the NCI feasibility study work carried out to date. The major question pending is whether bald eagle exposures to DDTs in this location will be so high as to interfere with natural reproduction; however, as discussed above, this restoration idea would not be pursued should the NCI feasibility study deliver such an outcome.

✓ Operational/Sustainability issues:

With the presumption that it is demonstrated that bald eagles are able to successfully produce young in the NCI, this idea would have minimal long-term operational requirements and would be self-sustaining.

✓ Regulatory issues:

Regulatory issues have already been addressed in the process of obtaining necessary approvals for the NCI bald eagle feasibility study.

3. Benefits to Injured Resources or Lost Services **Rating: High**

✓ Duration:

Continued implementation would have long-term benefits to bald eagles in the Channel Islands.

✓ Are benefits measurable?

Yes. Pre and post-implementation monitoring would allow benefits to be measured.

✓ What are the benefits in the absolute sense?

Restoring self-sustaining pairs of bald eagles to the Northern Channel Islands would directly address a pivotal natural resource injury of the Montrose case. Bald eagles historically played an important role in the ecology of the Channel Islands by serving as both a top-level predator and scavenger. There is no other species that plays the same ecological role. Since the extirpation of bald eagles on the NCI, golden eagles (not native to the NCI) have become established on Santa Cruz Island. Nesting adult bald eagles defend territories and would exclude golden eagles from the island. The golden eagle, a terrestrial predator, has had tremendous negative impacts on native island foxes, which are listed as Threatened by the State of California and Endangered by the USFWS. Thus restoration of adult breeding bald eagles should benefit the island fox, and contribute to the restoration of ecological balance on the NCI.

✓ Conservation Status?

The bald eagle population in California is currently included on the list of threatened and endangered species. This species is a high priority for restoration efforts.

4. Ecosystem Benefits **Rating: Med**

This idea focuses on single-species restoration rather than ecosystem level (e.g. habitat manipulation) restoration; however, since the bald eagle uniquely fills an ecological role as a top-level predator, its presence on the Northern Channel Island conveys broader ecosystem benefits.

Restore Bald Eagles on the Northern Channel Islands Total Tier 1 Score: **High**

Category: Bald Eagles **Number: 3**

Idea: **Restore Bald Eagles on the Mainland**
Source: 1994 Garcelon Report; Bird Technical Workshop, Public Workshop

Summary Description

This Tier 1 evaluation addresses several similar ideas for restoring bald eagles outside of the Channel Islands, i.e. on the North American mainland (both in Southern California and Baja California).

The intent of this concept and its several specific ideas is to restore/enhance bald eagle habitat on the mainland of Southern California and Baja California by promoting and enhancing breeding and wintering opportunities. Bald eagles are expanding their range within California at approximately 12 pairs per year (Ron Jurek, CDFG, pers. comm.). Construction of reservoirs has created new bald eagle habitat in Southern California. Important wintering locations in Southern California currently include the San Bernardino Mountains (Silverwood Lake, Lake Arrowhead, Big Bear Lake, Gregory Lakes), Lake Matthews in Riverside County, and Lake Cachuma in the Santa Ynez Valley.

A pair of bald eagles nested in Lake Hemet in Riverside County in 2003, representing the first time that bald eagles have nested in Southern California since the 1920s. No other breeding locations have been confirmed, although there are reports of unsuccessful attempts at Lake Skinner and Lake Elsinore in Riverside County.

The following are examples of mainland sites that could be further evaluated for restoration potential:

Silverwood Lake: Silverwood Lake in located in the San Bernardino Mountains. The California Department of Parks and Recreation administers Silverwood Lake Recreation Area. Recreational activities include day use, camping, boating, swimming, waterskiing, jet skiing, and fishing. Approximately 75,000 annual visitors recreate at the lake.

A Bald Eagle Territory Management Plan for Silverwood Lake was prepared in 2003 by Brian Walton. This report was based on a study of eagles at Silverwood Lake from 1995-2002. Wintering eagles have been consistently documented on an annual basis, although no breeding has occurred. Winter "housekeeping" pairs have occurred and nest trees have been identified, but no real nesting territory has been established. In general, Silverwood Lake is occupied by 4-6 eagles during the months of December and January. Adequate food resources are available at the Lake. Due to the multiple-use pressures of the lake, the Management Plan focuses on recommendations to maintain wintering eagles.

Recommendations for restoration at Silverwood Lake included: 1) Protecting existing and potential nest trees; 2) Encouraging growth of replacement nest and roost trees, 3) Providing ¼ mile buffer zones around nesting pairs, 4) Protecting snags/rock outcrops, 5) Creating new perches around channel area and north end of lake; 6) Limiting public use and implementing seasonal closures, 7) Promoting a Bald Eagle education program.

Big Bear Lake: In 1998, a population of 15 to 28 bald eagles wintered at Big Bear and Baldwin Lakes. The Big Bear area hosts over 6.5 million annual visitors and has permanent population of about 15,000 residents. The overall management of the Lake is the responsibility of the Big Bear Municipal Water District. The *Big Bear Lake Rehabilitation and Enhancement Plan* seeks to engineer and recontour the lake bottom to: 1) Eradicate noxious aquatic plants, 2) Expand public access to the Lake, 3) Create more efficient water storage and flood control capability, 4) Improve water quality, 5) Control incoming sediment and remove existing sediment, and 6) Utilize dredged Lake bottom material for habitat construction projects. Based on the goals of the Plan to expand public access to the Lake, it is unlikely that restoration activities could be performed to encourage breeding at this Lake.

Lake Hemet: Lake Hemet is a good breeding site for bald eagles because it offers secluded stands of trees and a mature stock of fish. Further restoration actions could be explored at this location.

Ken Malloy Harbor Regional Park: This idea was raised at the Public Workshop in 2003.The goal of this idea would be to enhance foraging habitat for bald eagles at Machado Lake within Ken Malloy Harbor Regional Park. The target area would be an approximate 55-acre-area in the southern part of the park that contains remnant wetlands and serves as a flood detention basin. The proponent supports overall restoration of the lake, including enhancement of fish resources and exotic weed removal. It is assumed that standardized methods for fish stocking and exotic removal would be used.

The watershed that drains into Machado Lake covers approximately 19.7 square miles of residential and heavily industrialized lands that drain from the adjacent communities of Harbor City, Lomita, Carson and Wilmington. Currently, Machado Lake is the repository of storm water discharge from several multi-jurisdictional storm drain systems. Chlordane, PCBs, and DDTs have been found within Machado Lake.

A Master Plan for the park has been developed. The Coastal Conservancy is completing a follow-up Implementation Plan. Although not specified as a target species for restoration within the plan, the idea proponent believes that such an idea would be well received since bald eagles are such a charismatic species. Currently, efforts are underway to prioritize those restoration projects that have been developed to date. There may be some funding opportunities with the Coastal Commission.

Other Sites: Santa Ynez Mountains, Baja California Coast: In addition to the sites above, additional ideas have been floated to consider enhancing bald eagle habitats at Lake Cachuma in the Santa Ynez Valley, and enhancing habitat on the Baja California coast. Characteristics of all of these potential sites and actions are sufficiently similar that all mainland bald eagle habitat restoration ideas are evaluated collectively in Tier 1.

Rating Criteria

Rating: Med

1. Nexus

The bald eagle is a priority resource that has demonstrated injury from DDT contamination.

✓ Location

The suggested locations would be on the Palos Verdes Peninsula, in the interior of Southern California, and in Baja California. They are not in immediate proximity, but are varying distances from the Channel Islands where the injuries of the case occurred and continue to occur.

Rating: Med

2. Feasibility

✓ Technical issues:

Enhancement activities such as roost protection and enhancement would be technically feasible. Restoration of native vegetation would also be technically feasible. It is uncertain whether such actions would be compatible with managing agencies' overall programs for the areas. The opportunities for restoration and enhancement of bald eagle habitats are limited in Southern California, largely due to the multiple-use management of the lakes and reservoirs. Many of the suitable habitat areas are subject to intense human recreation that results in unacceptable levels of disturbance to eagles. There may be opportunities for land acquisition (for roost protection, etc.) adjacent to these areas or for smaller improvements to perch sites. In general, however, restoration opportunities are limited in Southern California due to the high level of human disturbance.

✓ Operational/Sustainability issues:

Several of the restoration actions, such as removal of exotic vegetation and replacement with native species, typically take several years to complete. Once established, periodic maintenance may be required to control non-native species. Actions such as roost protection and enhancement would presumably be designed to minimize need for periodic maintenance.

✓ Regulatory issues:

There would be minimal regulatory issues related to habitat enhancement aspects of the mainland bald eagle restoration ideas. To the extent that the utility of certain sites as bald eagle nesting habitat would be limited because of ongoing human disturbances, placing restrictions on public access would present challenging regulatory hurdles.

3. Benefits to Injured Resources or Lost Services **Rating: Med**

✓ Duration:

While habitat enhancements per se are likely to endure for a long time, it is hard to predict whether these actions would translate into long term success at restoring breeding bald eagles to many areas, given the large human population in Southern and Baja California and associated intense human use.

✓ Are benefits measurable?

A monitoring effort could be designed to measure the success of these ideas at restoring breeding bald eagles.

✓ What are the benefits in the absolute sense?

Restoring breeding bald eagles in mainland areas of Southern California and Baja California would not directly restore those specific resources injured and services lost as a result of the contaminants of the Montrose case, since the injuries of the case were to the breeding pairs of bald eagles in the Channel Islands. However, one reason why mainland restoration options have been put forward is that bald eagles reintroduced to Catalina Island have continued to experience reproductive problems related to the Montrose contamination, and it is still uncertain whether efforts in the Northern Channel Islands will prove to be more successful. Restoring breeding bald eagles on the mainland, while not directly aligned with the goals of the restoration program, could be considered an out of area and thus less than ideal replacement for restoring bald eagles to the Channel Islands, and for this reason is not rated as high as actions to restore bald eagles in the Channel Islands.

✓ Conservation Status?

The bald eagle population in California is currently included on the List of Threatened and Endangered species. This species is a high priority for restoration efforts.

4. Ecosystem Benefits **Rating: Med**

Since these ideas involve habitat protection and enhancement, they would likely provide broader benefits to multiple species.

Restore Bald Eagles on the Mainland Total Tier 1 Score: **Medium**

Peregrine Falcons

MSRP Peregrine Falcon Restoration Ideas

Tier 1 Results: ***Updated 8/02/04***

#	Peregrine Falcon Restoration Project Ideas	Nexus	Feasibility	Benefit	Ecosystem Benefit	Total Score
1.	Restore Peregrine Falcons to the Southern Channel Islands	High	High	High	Low	High
2.	Restore Peregrine Falcon Populations on Baja California Peninsula Islands	Med	Med	Med	High	High
3.	Acquire and Enhance Peregrine Falcon Habitat on the Palos Verdes Peninsula	Med	Med	Low	Med	Med
4.	Create Peregrine Falcon Management Group	Med	Med	Low	Med	Med
5.	Enhance Foraging Habitat for Peregrine Falcons at Ken Malloy Harbor Regional Park	Med	Low	Low	Med	Low

Category: Peregrine Falcons **Number: 1**

Idea: **Restore Peregrine Falcons to the Southern Channel Islands**
Source: 1994 Walton Report, Santa Cruz Predatory Bird Research Group

Summary Description

The purpose of this idea would be to restore peregrine falcons to the Southern Channel Islands. Recolonization of the Southern Channel Islands (including Santa Catalina, San Nicholas, and San Clemente) has been slow compared to the Northern Channel Islands. The idea would entail speeding up recolonization on the Southern Channel Islands through active restoration via hacking techniques. Hacking is a process which involves releasing fledgling peregrine falcons from a hack box and supplementing food for the birds until they develop adequate hunting skills. Because of the presence of endangered bird species on both San Clemente and San Nicholas Islands (that may be predated upon by the falcons), this concept would involve releasing birds only on Catalina Island. Recolonization could also be facilitated by releasing peregrine falcons from the mainland close to the Channel Islands in order to encourage birds to disperse to the Southern Channel Islands. Peregrine falcons of west coast origin that were either bred in captivity or removed from urban structures would be released. All released peregrine falcons would be banded with both USFWS bands and alpha-numeric bands that could be read at a distance. A monitoring program would be developed to monitor breeding, foraging, and dispersal activities.

Based on the amount of available and suitable peregrine falcon habitat on the Channel Islands, enhancement of nesting habitat would not be a priority for this effort. Habitat loss or degradation was not a factor in the decline of the peregrine falcon on the Channel Islands and is not currently a limiting factor in the recovery of the species on the Southern Channel Islands. Therefore, the restoration of peregrine falcons to the Southern Channel Islands would focus instead on augmenting the population through active restoration techniques (e.g., hacking birds), increasing the seabird prey base, and monitoring.

Implementation would also involve monitoring contaminant levels of any breeding pairs on the Southern Channel Islands. Contaminant levels could then be compared to peregrine falcons breeding on the Northern Channel Islands. Egg and eggshell samples would be collected according to established protocols in a manner consistent with previously collected data.

Rating Criteria

1. Nexus **Rating: High**

The peregrine falcon is a priority resource that demonstrated injury from DDT contamination.

✓ Location

The Southern Channel Islands are located within the Southern California Bight (SCB).

2. Feasibility **Rating: High**

✓ Technical issues:

The methodology suggested has been successfully employed worldwide to re-establish peregrine falcons and other species. Hacking peregrine falcons has been successful in other areas of California, and has contributed to the recovery of this species on the mainland. The suggested methodology would be technically sound and feasible and the likelihood of re-establishing peregrine falcons on the Southern Channel Islands would be high.

✓ Operational/Sustainability issues:

Once birds were released from the hack towers, there would be minimal operational work beyond monitoring. On-going contamination of the food web might impair the ability of peregrine falcons to successfully reproduce on the Southern Channel Islands. This issue will be considered more closely in Tier 2.

✓ Regulatory issues:

Permission to release peregrine falcons onto Catalina Island would need to be secured from landowners such as the Catalina Island Conservancy. Because of the presence of endangered bird species on both San Clemente and San Nicholas Islands (both islands are owned by the U.S. Navy), this idea suggests releasing peregrine falcons only on Catalina Island.

3. Benefits to Injured Resources or Lost Services **Rating: High**

✓ Duration:

If additional peregrine falcons re-established breeding territories on the Southern Channel Islands, benefits are anticipated to be long-term.

✓ Are benefits measurable?

Yes. Post-implementation monitoring would document whether implementation was successful in recolonizing the Southern Channel Islands.

✓ What are the benefits in the absolute sense?

Implementation would encourage the recolonization of peregrine falcons into historically occupied habitat on the islands of Santa Catalina, Santa Barbara Island, San Nicholas, and San Clemente. Re-establishment of peregrine falcons on the Southern Channel Islands would provide direct long-term benefits to this species.

✓ Conservation Status?

The peregrine falcon was delisted from the List of Threatened and Endangered Species on August 25, 1999. This species is a high priority for restoration efforts.

4. Ecosystem Benefits **Rating: Low**

This idea focuses on single-species restoration rather than ecosystem level restoration.

Restore Peregrine Falcons to the Southern Channel Islands

Total Tier 1 Rating: **High**

Category: Peregrine Falcons **Number: 2**

Idea: **Restore Peregrine Falcon Populations on Baja California Peninsula Islands**

Source: Island Conservation and Ecology Group (ICEG)

Summary Description

ICEG suggested a restoration idea involving a comprehensive five-year seabird and peregrine falcon protection and restoration program for the ten northernmost islands off the Pacific coast of the Baja California Peninsula. The program would focus on the following nine actions: 1) removing damaging introduced mammals (except on Cedros Island); 2) decreasing and eventually halting land conversion; 3) decreasing direct human disturbance of seabirds; 4) decreasing shore based light pollution in and adjacent to seabird colonies; 5) developing and posting interpretive and warning signs; 6) developing and implementing an environmental marketing program for island users; 7) implementing an invasive species introduction prevention and response plan; 8) posting two biologists on each island for extended periods every year to serve as conservation monitors that would be an effective force for protection; 9) producing draft biodiversity-centered management plans for implementation once the protected area was decreed and fully staffed.

The idea separates out the different island groups and identifies threats and opportunities for restoration within each group. Environmental compliance for major components of this project has been completed and the project has the support of Mexican government agencies. The Tier 2 evaluation will identify and evaluate the most promising restoration activities for peregrine falcons from this idea.

Rating Criteria

1. Nexus **Rating: Med**

The peregrine falcon is a priority resource that demonstrated injury from DDT contamination. Peregrine falcons have historically nested on the Baja Peninsula Islands and are currently nesting on a majority of them.

✓ Location

Three of these island groups comprise 910 ha (Los Coronados, Todos Santos, and San Martin) and are located in the SCB. The remaining seven islands comprise 28,090 ha (San Jeronimo, San Benito, Cedros, Guadalupe, Natividad, Asuncion, San Roque) and are located outside the SCB.

2. Feasibility **Rating: Med**

✓ Technical issues:

In general, the different components would be technically feasible. Actions such as the removal of introduced mammals, signage, and the reduction of human disturbance are all activities that have been successfully implemented on other islands. Other proposed actions, such as the decrease and eventual halt of land conversion might be less feasible. The most feasible components will be carried forward for further evaluation.

✓ Operational/Sustainability issues:

Depending on which actions were selected, operational constraints would vary. Eradication programs usually have follow-up maintenance and prevention issues.

✓ Regulatory issues:

The proponent appears to have the support and appropriate regulatory permits to implement this idea. The issues of long-term protection and accountability will be explored further in Tier 2.

3. Benefits to Injured Resources or Lost Services **Rating: Med**

✓ Duration:

Implementation would have long-term benefits to seabird populations through the removal of introduced predators and restoration of island ecosystems. The increase in seabird populations would benefit peregrine falcons, as seabirds likely compose a significant percentage of their diet on the islands. Benefits to peregrine falcons from the reduction in human disturbance would last as long as those measures were in place.

✓ Are benefits measurable?

Yes. Pre- and post-implementation monitoring would allow benefits to be measured.

✓ What are the benefits in the absolute sense?

In general, peregrine falcons are less prone to human disturbance than seabirds due to the location of their breeding habitat on cliffs, versus on the ground for seabirds. However, peregrine falcons have been documented as nesting on the ground and could benefit from a reduction in human disturbance at their nesting sites. Peregrine falcons would also benefit from increased protection of seabird colonies at these islands. The increased protection and restoration of seabird habitat by removing introduced mammals and decreasing human disturbance would provide for substantial increases in seabird populations. These actions would benefit peregrine falcons by increasing their prey base. The goal of this effort would be to increase the number of peregrine falcons on the Baja islands (particularly the northern Baja islands) in order to facilitate the recovery of the species on Southern Channel Islands and the Southern California Bight.

✓ Conservation Status?

The peregrine falcon was delisted from the List of Threatened and Endangered Species on August 25, 1999. This species is a high priority for restoration efforts.

4. Ecosystem Benefits **Rating: High**

Eradication actions would have benefits on an island-ecosystem level, whereas actions such as signage would have more focused benefits to particular species.

Restore Peregrine Falcon Populations on Baja California Peninsula Islands

Total Tier 1 Rating: **High**

Category: Peregrine Falcons **Number: 3**

Idea: **Acquire and Enhance Peregrine Falcon Habitat on the Palos Verdes Peninsula**

Source: Palos Verdes Peninsula Land Conservancy

Summary Description

This restoration idea was suggested by the Palos Verdes Peninsula Land Conservancy at one of the Public Workshops in January 2003. The Palos Verdes Peninsula Land Conservancy is a nonprofit, public-benefit corporation dedicated to preserving undeveloped land in perpetuity as open space for historical, educational, ecological, recreational and scenic purposes. Several ideas were raised by this group for acquiring and enhancing habitat for peregrine falcons on the Palos Verdes Peninsula. These ideas are outlined below.

Portuguese Bend Regional Open Space Park: The proposed Portuguese Bend Regional Open Space Park currently includes Barkentine Canyon (100 acres), Abalone Cove Park (112 acres), and the Forrestal Property (160 acres). The Palos Verdes Land Conservancy suggests acquiring and restoring lands bordering the Park, as well as restoring portions of the 160-acre Forrestal Property. These areas have existing coastal sage scrub habitat. At the time of the Public Workshops in 2003, the Palos Verdes Land Conservancy stated that funding was not available for the acquisition of new land, or for restoration of sites in the Park. Restoration activities would include planting of native vegetation (e.g., coastal sage scrub) and removal of exotic plants such as iceplant. Restoration of these vegetation communities would follow standardized methods for restoration.

The Palos Verdes Land Conservancy is currently developing an overall framework for restoration for the preserved areas on the Palos Verdes Peninsula. The proponent suggests that the MSRP could contribute funding to the already-established habitat restoration program. The Palos Verdes Land Conservancy would consider any additional restoration activities onsite that would enhance the habitat for peregrine falcons.

White Point Nature Preserve: The goal of this idea would be to enhance foraging habitat for peregrine falcons at the White Point Nature Preserve by restoring habitat types such as coastal sage scrub. This 102-acre natural area was once a key military reservation and part of the coastal defense of Los Angeles. In 1999, the Los Angeles Department of Recreation and Parks declared the site a natural preserve and directed the staff to develop an agreement with the Palos Verdes Peninsula Land Conservancy for management of the site.

The White Point Nature Preserve currently consists of vegetation habitats that have been highly disturbed by human activity. Historically the site supported coastal sage scrub, coastal bluff scrub and native grassland plant communities. Only very small patches of coastal sage scrub remain scattered throughout the site. According to the White Point Master Plan (2001), only the most common wildlife species associated with urbanized conditions are present onsite due its disturbed state, and no special status species of animals have been observed. This Master Plan emphasizes the restoration of native plant communities onsite. The Palos Verdes Land Conservancy suggests that funding might be directed to the restoration of this site.

Rating Criteria

1. Nexus **Rating: Med**

The peregrine falcon is a priority resource that demonstrated injury from DDT contamination.

✓ Location

The proposed locations are on the Palos Verdes Peninsula, within the SCB.

A high rating is given to those ideas that restore peregrine falcon populations on the Channel Islands, since that area is the focus of the restoration efforts. Peregrine falcons have recovered throughout the mainland.

Feasibility **Rating: Med**

✓ Technical issues:

Restoration of coastal sage scrub and southern cactus scrub habitat types would be technically feasible. Methodologies would be based on successful efforts elsewhere on the Palos Verdes Peninsula.

✓ Operational/Sustainability issues:

Coastal sage scrub restoration typically takes a minimum of five years to establish vegetation. Once established, periodic maintenance might be required to control non-native species.

✓ Regulatory issues:

There would be minimal regulatory issues regarding such an effort. The Palos Verdes Peninsula Land Conservancy is supportive of this idea.

2. Benefits to Injured Resources or Lost Services **Rating: Low**

✓ Duration:

Benefits are expected to be long term if exotic weeds were controlled and the site remained protected.

✓ Are benefits measurable?

Yes. Post-implementation monitoring would document any success in restoring target habitat types.

✓ What are the benefits in the absolute sense?

Peregrine falcons have been observed on the Palos Verdes Peninsula and breed in the Los Angeles Harbor area. The restoration of lands on the Palos Verdes Peninsula would improve foraging opportunities for peregrine falcons as the habitat quality onsite increases. However, foraging habitat is not limited for the peregrine falcon in the area; therefore, benefits to this species are expected to be minimal.

✓ Conservation Status?

The peregrine falcon was delisted from the List of Threatened and Endangered Species on August 25, 1999. This species is a high priority for restoration efforts.

3. Ecosystem Benefits **Rating: Med**

These habitat restoration efforts would benefit coastal sage scrub dependent species.

Acquire and Enhance Peregrine Falcon Habitat on the Palos Verdes Peninsula Total Tier 1 Rating: **Med**

Category: Peregrine Falcons **Number: 4**

Idea: **Create Peregrine Falcon Management Group**
Source: US Fish and Wildlife Service

Summary Description

This restoration idea would involve creating a group of agency and peregrine falcon experts to form a management group. This group could consist of agencies such as the California Department of Fish and Game, U.S. Fish and Wildlife Service, Santa Cruz Predatory Bird Research Group, and The Peregrine Fund. With the on-going recovery of the peregrine falcon in California, State and Federal agencies are faced with challenges on how to manage the conflicts that sometimes occur between peregrine falcons and other sensitive species (e.g., the federally endangered California least tern). This working group would address issues relating to predation of sensitive bird species, contaminant monitoring, coordination of surveys, and other issues related to the management of the peregrine falcon. Funds would cover expenses related to travel, labor, public education materials, or management actions (e.g., relocation of a peregrine falcon that was predating on sensitive species).

Rating Criteria

1. Nexus **Rating: Med**

The peregrine falcon is a priority resource that experienced injury from DDT contamination.

✓ Location

The group would focus on peregrine falcon issues in Southern California.

A high rating is given to those ideas that restore peregrine falcon populations on the Channel Islands, since that area is the focus of the restoration efforts. Peregrine falcons have recovered throughout the mainland. It is assumed that this group would mainly focus on mainland issues.

2. Feasibility **Rating: Med**

✓ Technical issues:

Creation of such a management group would be technically feasible and has been done in the past.

✓ Operational/Sustainability issues:

In order to maximize the success of the effort, members would have to commit to regularly scheduled meetings.

✓ Regulatory issues:

No permits would be required to form such a management group.

3. Benefits to Injured Resources or Lost Services **Rating: Low**

✓ Duration:

Benefits of a management group could be short-term and long-term. An example of a short-term benefit would be the coordination of the temporary removal of a peregrine falcon that is predating on sensitive resources during the breeding season. However, in this case the benefit would be more for the sensitive prey resource, rather than the peregrine falcon. A long-term benefit that could be derived from such a management group would be the development of long-term monitoring protocols.

✓ Are benefits measurable?

It would be difficult to measure the benefits since this effort would involve the creation of a management group. However, it might be possible to evaluate the products and/or decisions completed as a measure of success.

✓ What are the benefits in the absolute sense?

The FWS has developed a *Monitoring Plan for the American Peregrine Falcon* in cooperation with State resource agencies, recovery team members, and other cooperators. The plan was finalized in August 2003. The objectives of this plan are to detect declines in territory occupancy, nest success, and productivity across the range of the peregrine falcon. A USFWS team comprised of a National Coordinator and coordinators from each USFWS Region was established to finalize and implement the monitoring plan. Responsibilities of the Coordinator include: convening teams to update the monitoring plan as needed, planning and analyzing surveys and monitoring results, and seeking funding opportunities. Although this group may not be able to handle specific issues on a site-by-site basis, there is currently an on-going effort to standardize monitoring protocols and detect changes in the peregrine falcon populations. Therefore, there may be some redundancy in the creation of another peregrine falcon management group.

Land managers address peregrine falcon issues typically on a site-by-site basis. The creation of a local Southern California group could help address management issues in the area. However, it is unlikely that the outcomes of such a group would result in on-the-ground restoration of peregrine falcon, particularly on the Channel Islands. Such a group may have more benefit to the sensitive prey resources such as the California least tern.

✓ Conservation Status?

The peregrine falcon was delisted from the List of Threatened and Endangered Species on August 25, 1999. This species is a high priority for restoration efforts.

4. Ecosystem Benefits **Rating: Med**

Establishing a management group would not have ecosystem level benefits, but could benefit sensitive bird species that are a prey resource of the peregrine falcon.

Create Peregrine Falcon Management Group Total Tier 1 Rating: **Med**

Category: Peregrine Falcons **Number: 5**

Idea: **Enhance Foraging Habitat for Peregrine Falcons at Ken Malloy Harbor Regional Park**

Source: LA Audubon Society

Summary Description

The goal of this restoration idea would be to enhance foraging habitat for peregrine falcons at Ken Malloy Harbor Regional Park. This 241-acre park is owned by the City of Los Angeles, and is the largest remnant of a formerly vast network of freshwater marshes, riparian woodland, and coastal sage scrub that once covered the southwestern Los Angeles Basin. The target area for restoration would be an area in the southern part of the park that contains suitable habitat for shorebirds. The focus of the effort would be to enlarge and enhance shorebird habitat, thereby increasing shorebird numbers and providing additional prey for peregrine falcons. Standard methods would be employed to create shallow water/mudflat areas. Factors such as size, slope, substrate, hydrology, surrounding landscape, and access would need to be considered during the design process.

A Master Plan for the park has been developed. A follow-up Implementation Plan is being completed by the Coastal Conservancy to prioritize those restoration projects that have been developed to date. The suggested restoration is not currently proposed within the Master Plan.

Rating Criteria

1. Nexus **Rating: Med**

The peregrine falcon is a priority resource that experienced injury from DDT contamination.

✓ Location .

Ken Malloy Harbor Regional Park is located on the Palos Verdes Peninsula where the cities of Wilmington, San Pedro and Harbor City meet. It is just a half-mile from the Los Angeles Harbor. Peregrine falcons breed in both Los Angeles and Long Beach Harbors. Peregrine falcons have been observed at the park during migration and winter months.

A high rating is given to those ideas that restore peregrine falcon populations on the Channel Islands, since that area is the focus area for the restoration efforts. Peregrine falcons have recovered throughout the mainland.

2. Feasibility **Rating: Low**

✓ Technical issues:

Creation and enhancement of habitat for shorebirds would be technically feasible.

✓ Operational/Sustainability issues:

Factors of concern regarding this idea would include: 1) high levels of human use within the park, 2) water quality issues, and 3) presence of invasive species.

✓ Regulatory issues:

There would be potentially competing interests and agencies within the Park. Permits would be required. Resistance may be encountered from multiple user groups within the Park. It is uncertain whether implementation would be compatible with the overall Master and Implementation Plans. Coordination among multiple entities would have to occur.

3. Benefits to Injured Resources or Lost Services **Rating: Low**

✓ Duration:

Periodic maintenance would be required to sustain benefits.

✓ Are benefits measurable?

The amount of additional mudflat created for shorebirds could be measured, but it would be difficult to asses how that would translate into benefits to the peregrine falcon.

✓ What are the benefits in the absolute sense?

Due to the extensive loss of coastal wetlands in Southern California, there is limited shorebird habitat available in Los Angeles. An increase in shorebird habitat would largely benefit shorebirds. Peregrine falcons are not limited by foraging habitat in the area; therefore, implementation would have minimal to negligible benefit to the peregrine falcon.

✓ Conservation Status?

The peregrine falcon was delisted from the List of Threatened and Endangered Species on August 25, 1999. This species is a high priority for restoration efforts.

4. Ecosystem Benefits **Rating: Med**

Implementation would benefit a variety of shorebirds.

Enhancement of Foraging Habitat for Peregrine Falcons at Ken Malloy Harbor Regional Park

Total Tier 1 Score: **Low**

Seabirds

MSRP Seabird Restoration Ideas

Tier 1 Results: ***Updated 7/28/04***

#	Seabird Restoration Project Ideas	Nexus	Feasibility	Benefit	Ecosystem Benefit	Total Score
1.	Restore Seabirds to San Miguel Island	High	Med	High	High	High
2.	Restore Alcids to Santa Barbara Island	High	Med	High	Med	High
3.	Restore Seabird Colonies on Southern Channel Islands	High	Med	High	High	High
4.	Seabird Habitat Restoration at Scorpion Rock	High	Med	High	Med	High
5.	Restore Seabird Populations on Baja California Peninsula Islands	Med	Med	High	High / Med	High
6.	Create/Enhance/Protect Brown Pelican Roost Habitat	High	Med	High	Low	High
7.	Implement Entanglement Reduction and Outreach Program to Protect Seabird Populations	High	High	Med	Med	High
8.	Restore Ashy Storm-Petrels to Anacapa Island	High	Med	High	Low	High
9.	Restore Ashy Storm-Petrels on Southeast Farallon Island	Med	Med	High	Med	Med
10.	Create Mainland Nesting Habitat for Colonial Seabirds	Med	Med	High	Med	Med
11.	Create Cormorant Nesting Platforms	High	Med	Med	Low	Med
12.	Fund Brown Pelican Patrol/Enforcement Position	High	Med	Med	Med	Med
13.	Enhance Nesting Habitat for Shearwaters in New Zealand	Low	Med	High	Med	Med
14.	Reintroduce Tufted Puffins to Prince Island	Med	Med	Med	Low	Med
15.	Purchase Bird Rock off Santa Catalina Island	High	Med	Low	Low	Med
16.	Create GIS Atlas of Brown Pelican Roost Sites	Med	Med	Low	Low	Med
17.	Enhance Nesting Habitat for Grebes and Loons in Northern California	Low	Med	Med	Low	Low
18.	Attract Common Murres to Prince Island	Low	Low	Med	Low	Low
19.	Attract Brown Pelicans to Prince Island and Scorpion Rock	High / High	Med / Low	Low / Low	Low / Low	Med/Low

Category: Seabirds **Number: 1**

Idea: **Restore Seabirds to San Miguel Island**
Source: Bird Technical Workshop, National Park Service

Summary Description

This restoration idea would entail eradicating black rats from San Miguel Island to benefit crevice nesting seabirds. Rats are known predators of crevice nesting seabirds and their eggs and chicks. Removing rats from the island would also benefit a myriad of other species on the island including lizards, invertebrates, inter-tidal animals and plants. The rats would be eradicated by dispersing a rodenticide via helicopter across the entire island. The methodology would be modeled after the recently completed Anacapa Island rat eradication project.

Rating Criteria

1. Nexus **Rating: High**

Species breeding on San Miguel Island that would benefit from rat eradication include Ashy Storm-petrels, Xantus's Murrelets, Cassin's Auklets, and Rhinoceros Auklets. Data collected in 1992 in the Southern California Bight (SCB) demonstrated severe (>15%) eggshell thinning in Ashy Storm-petrel and Cassin's Auklet eggs due to DDT contamination (Kiff 1994). Xantus's Murrelets were documented as having elevated levels of DDT contamination (Fry 1994).

✓ Location

San Miguel Island is one of the Channel Islands, which are located within the SCB.

2. Feasibility **Rating: Med**

✓ Technical issues:

There would be several technical issues with rat eradication; however, a tremendous amount has been learned from the Anacapa Island Project mentioned above. San Miguel Island has less complex topography than Anacapa Island. Similar to Anacapa Island, there would be issues related to protection of native deer mice and raptors. The presence of the Federally Endangered island fox would present the greatest technical challenge. All foxes are currently being held in captive facilities and the NPS is planning on releasing some foxes starting in the fall of 2004. It is likely that all released foxes would have to be recaptured prior to the rat eradication in order to minimize secondary poisoning.

✓ Operational/Sustainability issues:

Once the rat eradication was complete, there would be minimal ongoing maintenance issues aside from preventing reintroduction of rats. The Anacapa Island Project is already putting such measures in place.

✓ Regulatory issues:

There would be multiple permitting/regulatory issues. However, the Anacapa Island Project demonstrated that such an undertaking would be feasible from a regulatory standpoint. The rat eradication would have to be timed such that disturbance to marine mammal rookeries and seabirds were minimized. The NPS is supportive of this restoration idea.

3. Benefits to Injured Resources or Lost Services **Rating: High**

✓ Duration:

Benefits would be long-term as long as the island remained rat-free. A prevention plan has already been developed for Anacapa Island and is currently being implemented. This idea advocates developing a similar plan for San Miguel Island.

✓ Are benefits measurable?

Yes. Following rat removal, monitoring could document increased seabird productivity fairly easily.

✓ What are the benefits in the absolute sense?

Rat removal would have ecosystem-wide benefits. Species that would benefit include crevice nesting seabirds, as well as plants, native mice, lizards, invertebrates, inter-tidal organisms, and others. Removal of introduced predators would have significant benefits to seabird populations by reducing predation and increasing reproductive success.

✓ Conservation Status?

The California Fish and Game Commission made a finding in February 2004 to list the Xantus's Murrelet as a Threatened species under the California Endangered Species Act. Ashy Storm-petrels, Cassin's Auklets, and Rhinoceros Auklets are Birds of Conservation Concern (FWS 2002). These species are of high priority for restoration efforts.

4. Ecosystem Benefits **Rating: High**

Although rat eradication would be targeted to directly benefit crevice nesting seabirds, it would also benefit the entire island ecosystem by removing a non-native predator from the ecosystem.

Restore Seabirds to San Miguel Island Total Tier 1 Rating: **High**

Category: Seabirds **Number: 2**

Idea: **Restore Alcids to Santa Barbara Island**
Source: Bird Technical Workshop, Point Reyes Bird Observatory, National Park Service

Summary Description

Two restoration ideas were submitted that focused on restoring alcids (primarily Cassin's Auklet) to Santa Barbara Island.

National Park Service Idea: This idea would entail undertaking a 4-year effort that would aim to restore Cassin's Auklet to Santa Barbara Island through the installation of artificial nest boxes and re-vegetation with native plants. Target attraction areas would include the hillside to the west behind the Park Service Ranger Station and the summit and southeastern bluffs of Signal Peak. Native plants and nest boxes would be planted and installed in an area approximately 100m x 100m. Birds would be attracted to the site using taped vocalizations. Implementation would also entail placing 100 nest boxes in each area and an additional 50 boxes on the terrace adjacent to the bluff south of Cave Canyon (along the presumed flyway). Monitoring of the nest boxes for 1 year could be incorporated into the Seabird Monitoring Program already in place at Santa Barbara Island.

PRBO Idea: The PRBO idea would involve designing, constructing, installing and monitoring artificial cavities for breeding alcids (Cassin's Auklets and Xantus's Murrelets) on Santa Barbara Island. The main objectives of this habitat restoration effort would be to: (1) increase recruitment, (2) increase reproductive output, and (3) decrease egg and chick mortality by providing safe breeding habitat. The timeline would be 5 years. PRBO would build and install a total of 200 nest boxes for each species (400 artificial sites in total). Artificial rock crevices would be designed for Xantus's Murrelets and deployed in the Cat Canyon area and along the island edge from the Boat Landing north. Nest sites for auklets would be placed near previously utilized areas on Signal Peak and near the Bunkhouse on SBI. Two vocalization playback systems would be used to attract auklets to these areas. A minimum of 5 years of monitoring is proposed to quantify the efficacy of the restoration efforts. Protocols for monitoring birds nesting in artificial cavities would follow those created by PRBO for alcids breeding on Southeast Farallon Island, California.

Rating Criteria

1. Nexus **Rating: High**

Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Cassin's Auklet eggs due to DDT contamination (Kiff 1994). Xantus's Murrelets were documented as having elevated levels of DDT contamination (Fry 1994).

✓ Location

Santa Barbara Island is located within the Channel Islands National Park, within the SCB.

2. Feasibility **Rating: Med**

✓ Technical issues:

Both the habitat creation and re-vegetation components would employ proven methods/techniques that have clearly demonstrated success in the past. The use of nest boxes has been successful in the past. In Northern California, nest boxes have enhanced the population growth rate of several cavity-nesting alcid species at various sites by increasing recruitment of breeding-age birds, improving productivity, and decreasing mortality.

✓ Operational/Sustainability issues:

Moderate operations and maintenance would be required. Minimal maintenance would be expected for cleaning of nest boxes. Re-vegetation area might require periodic exotic removal. After implementation, benefits would be self-sustaining.

✓ Regulatory issues:

Permits would be required. The NPS would likely support attraction efforts; however, there may be some resistance to the creation of artificial habitats.

3. Benefits to Injured Resources or Lost Services **Rating: High**

✓ Duration:

Benefits are anticipated to be long-term.

✓ Are benefits measurable?

Yes. Post-implementation monitoring would document any success.

✓ What are the benefits in the absolute sense?

The increase in breeding habitat would likely result in an increase of the number of breeding pairs of Cassin's Auklets and Xantus's Murrelets on Santa Barbara Island and the Channel Islands. There would likely be long-term benefits.

✓ Conservation Status?

Xantus's Murrelets and Cassin's Auklets are both Birds of Conservation Concern (FWS 2002) and are high priority species for restoration efforts. The California Fish and Game Commission made a finding in February 2004 to list the Xantus's Murrelet as a Threatened species under the California Endangered Species Act.

4. Ecosystem Benefits **Rating: Med**

This restoration idea includes habitat improvements that may benefit multiple species. However, the focus would be on alcids.

Restore Alcids to Santa Barbara Island Total Tier 1 Rating: **High**

Category: Seabirds **Number: 3**

Idea: **Restore Seabird Colonies on Southern Channel Islands**
Source: Bird Technical Workshop, 1994 Carter and Gress Report

Summary Description

This concept would look at restoration opportunities for the Southern Channel Islands (Catalina, Santa Barbara, San Nicholas, and San Clemente). Potential actions include: 1) eradicating feral cats, 2) reducing human disturbance at seabird nesting and roosting colonies (signage, fencing), and 3) restoring Brandt's cormorant and Western Gull populations on San Nicholas Island.

Rating Criteria

1. **Nexus** **Rating: High**

Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Western Gull and Brandt's Cormorant eggs due to DDT contamination (Kiff 1994).

✓ Location

The Southern Channel Islands lie within the SCB.

2. **Feasibility** **Rating: Med**

✓ Technical issues:

In general, these types of actions are technically feasible. Eradicating feral cats would pose technical challenges; however, efforts to eradicate cats on islands have been successful in the past on other island systems. The presence of the Island fox may pose technical challenges. The installation of signage and fencing would be feasible.

✓ Operational/Sustainability issues:

There would likely be operational issues with cat eradication, particularly on Catalina Island. Eradication would likely be sustainable on the islands as long as measures were taken to prevent the reintroduction of the cats back to the islands. The installation of fencing and signage would require some periodic upkeep.

✓ Regulatory issues:

Any restoration on San Clemente and San Nicholas Islands would require Navy permission. The Navy has been doing some cat eradication in recent years on San Clemente Island. There could be some opportunity for partnering on restoration efforts for these islands. On Catalina Island, coordination and outreach with both the Catalina Conservancy and the public would be necessary.

3. **Benefits to Injured Resources or Lost Services** **Rating: High**

✓ Duration:

Eradication of feral cats would have long-lasting impacts if the islands remained cat-free. The effects of signage and fencing would be in part dependent on maintenance, but is anticipated to have long-term benefits.

✓ Are benefits measurable?

Yes. One component of the restoration idea is a monitoring program.

✓ What are the benefits in the absolute sense?

Depending on the specific ideas that were developed in Tier 2, the majority of the benefit from cat eradication would be derived from reduced predation and increased habitat protection.

✓ Conservation Status?

Brandt's Cormorants are a moderate priority species for restoration. Western Gulls are of low priority for restoration efforts.

4. Ecosystem Benefits **Rating: High**

Removal of cats would have a positive impact on the island ecosystem and would have benefits to multiple resources, including small mammals.

Restore Seabird Colonies on Southern Channel Islands Total Tier 1 Rating: **High**

Category: **Seabirds** **Number: 4**

Idea: **Seabird Habitat Restoration at Scorpion Rock**
Source: US Geological Survey

Summary Description

Scorpion Rock, located off of Santa Cruz Island, is an important nesting island for burrow-nesting seabirds and supports a diverse community of seabirds in California. This small islet is under the jurisdiction of the National Park Service and is identified as a National Monument. This idea would entail improving seabird habitat by restoring vegetation to the main islet. Elimination of invasive plants and restoration of native plants would benefit burrow-nesting species by providing increased habitat and stabilization of the rapidly eroding soil horizon. Artificial nest boxes would be installed to increase reproductive success. In addition to habitat restoration, disturbance reduction efforts would be implemented to protect nesting and roosting seabirds from human disturbance. Scorpion Rock is closed to the public, but kayakers still land occasionally on the island.

Rating Criteria

1. Nexus **Rating: High**

Species breeding or roosting on Scorpion Rock that would benefit from this habitat restoration include Ashy Storm-petrels, Xantus's Murrelets, Cassin's Auklets, Rhinoceros Auklets, Brown Pelicans, and Double-crested Cormorants. Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Ashy Storm-petrel, Cassin's Auklet, Brown Pelican, and Double-crested Cormorant eggs due to DDT contamination (Kiff 1994). Xantus's Murrelets also showed elevated levels of DDT contamination (Fry 1994).

✓ Location

Scorpion Rock is adjacent to Santa Cruz Island within the Channel Islands National Park, within the SCB.

2. Feasibility **Rating: Med**

✓ Technical issues

Habitat creation and re-vegetation are proven methods for enhancing seabird populations. The use of nest boxes has been successful in the past. In Northern California, nest boxes have enhanced the population growth of several cavity-nesting species by increasing recruitment of breeding-age birds, improving productivity and decreasing mortality. Monitoring at Scorpion and Prince Rock has demonstrated the effective use of pilot artificial burrows to enhance degraded nesting habitat, and facilitate monitoring for this species in the Channel Islands (USGS unpublished data). The disturbance reduction actions would consist of signage and possible increased enforcement, both of which would be technically feasible.

✓ Operational/Sustainability issues

Moderate operations and maintenance would be required. Minimal maintenance would be expected for cleaning of nest boxes. Periodic exotic vegetation removal may be needed. After implementation, benefits would be self-sustaining.

✓ Regulatory issues

Permits would be required. The National Park Service would likely support efforts; however, there may be some resistance to the creation of artificial habitats.

3. Benefits to Injured Resource or Lost Services **Rating: High**

✓ Duration

Benefits are anticipated to be long-term.

✓ Are benefits measurable?

Yes. Post-implementation monitoring could document any success.

✓ What are the benefits in the absolute sense?

Habitat restoration on Scorpion Rock would likely result in an increase of the number of breeding pairs of Cassin's Auklets, Xantus's Murrelets and Ashy Storm-petrels. Reducing disturbance to roosting pelicans and cormorants would have a positive influence on their energy budgets and survival by reducing energy costs associated with flushing and relocating due to human disturbance.

✓ Conservation Status?

The California Fish and Game Commission made a finding in February 2004 to list the Xantus's Murrelet as a Threatened species under the California Endangered Species Act. Ashy Storm-petrels and Cassin's Auklets are both Birds of Conservation Concern (FWS 2002). The California Brown Pelican is a Federally listed threatened species.

4. Ecosystem Benefits **Rating: Med**

Implementation would benefit multiple seabird species. Removal of exotic vegetation might have some ecosystem wide benefits; however, such habitat restoration would largely benefit seabirds.

Seabird Habitat Restoration at Scorpion Rock Total Tier 1 Rating: **High**

Category: Seabirds/Peregrines **Number: 5**

Idea: **Restore Seabird Populations on Baja California Peninsula Islands**
Source: Bird Technical Workshop, Island Conservation and Ecology Group

Summary Description

ICEG submitted a restoration idea comprised of a comprehensive, five-year, $3 million seabird and Peregrine Falcon protection and restoration program for the ten northernmost islands off the Pacific coast of the Baja California Peninsula. The program would focus on the following nine actions: 1) Removing damaging introduced mammals (except on Cedros Island); 2) Decreasing and eventually halting land conversion; 3) Decreasing direct human disturbance of seabirds; 4) Decreasing shore-based pollution from lights in and adjacent to seabird colonies; 5) Developing and posting interpretive and warning signs; 6) Developing and implementing an environmental marketing program for island users; 7) Implementing an invasive species introduction prevention and response plan; 8) Posting two biologists on each island for extended periods every year to serve as conservation monitors that would be an effective force for protection; 9) Producing draft biodiversity-centered management plans for implementation once the protected area was decreed and fully staffed.

The restoration idea separates out the different island groups and identifies threats and opportunities for restoration within each group. Environmental compliance for major components of this project has been completed and the project has the full support of all of the relevant government agencies. All or parts of this project could be carried forward for future evaluation.

The most promising actions for restoration at this point are: 1) removing damaging introduced mammals; 2) decreasing direct human disturbance of seabirds, and 3) implementing an invasive species introduction prevention and response plan.

Rating Criteria

1. Nexus **Rating: Med**

Implementing this idea would help restore 15 species of seabirds including Brown Pelicans, Xantus's Murrelets, Cassin's Auklets, Ashy Storm-petrels, Black-vented Shearwaters, Brandt's and Double-crested Cormorants.

Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Cassin's Auklet, Brandt's Cormorant, Double-crested Cormorant, Brown Pelican, and Ashy Storm-petrel eggs due to DDT contamination (Kiff 1994). Xantus's Murrelets were documented as having elevated levels of DDT contamination (Fry 1994).

✓ Location

Three of these island groups comprising 910 ha (Los Coronados, Todos Santos, and San Martin) are in the SCB, but located south of the U.S. Border. The remaining seven islands comprise 28,090 ha (San Jeronimo, San Benito, Cedros, Guadalupe, Natividad, Asuncion, San Roque) and are located outside the SCB, but are breeding and roosting sites for seabirds that use the SCB during the breeding and non-breeding season.

2. Feasibility **Rating: Med**

✓ Technical issues:

In general, the different components would be technically feasible. Actions such as the removal of introduced mammals, signage, and the reduction of human disturbance have all been successfully implemented on other islands. Other proposed actions, such as the decrease and eventual halt of land conversion, may be less feasible. Certain components could be carried forward, rather than the entire package.

✓ Operational/Sustainability issues:

Depending on the action selected, the operational constraints would vary. Eradication programs usually have follow-up maintenance issues.

✓ Regulatory issues:

Based on the submitted idea, these actions would be feasible from a regulatory standpoint. The proponent appears to have the support and appropriate regulatory permits from the Mexican Government to implement this idea.

3. Benefits to Injured Resources or Lost Services **Rating: High**

✓ Duration:

Long-term benefits to seabird populations would be provided through removal of introduced predators and restoration of island ecosystems.

✓ Are benefits measurable?

Yes. Pre and post-implementation monitoring would allow benefits to be measured.

✓ What are the benefits in the absolute sense?

In addition to protecting existing populations of seabirds, the proposed actions would restore new seabird habitat by removing introduced mammals and decreasing human disturbance, thus allowing substantial increases in seabird populations.

✓ Conservation Status?

Brown Pelicans, Xantus's Murrelets, Cassin's Auklets, Brandt's and Double-crested Cormorants are all high priority species for restoration efforts. The California Fish and Game Commission made a finding in February 2004 to list the Xantus's Murrelet as a Threatened species under the California Endangered Species Act.

4. Ecosystem Benefits **Rating: High/Med**

Eradication actions would have benefits on an island-ecosystem level, whereas actions such as signage would have more focused benefits to particular species.

Restore Seabird Populations on Baja California Peninsula Islands Total Tier 1 Rating: **High**

Category: Seabirds **Number: 6**

Idea: **Create/Enhance/Protect Brown Pelican Roost Habitat**
Source: Bird Technical Workshop, American Trader Restoration Plan, 1994 Carter and Gress Report

Summary Description

Restoration ideas in this category aim to benefit the California Brown Pelican by restoring and improving critical non-breeding habitat. Specifically, these ideas propose to enhance, create and protect coastal roosts along the Southern California mainland.

Communal roost sites are essential habitat for Brown Pelicans (Gress and Anderson 1983). The primary roost sites for Brown Pelicans in the western U.S. are offshore rocks and islands on the outer coast, and sand islands within large estuaries (Briggs *et al.* 1987, Jaques 1994). Intense shoreline development, wetland filling, and other habitat alteration has eliminated much of the natural onshore roost habitat. Loss of historic roost habitat from human encroachment has been somewhat offset by the addition of artificial structures, such as jetties, breakwaters and floating structures. Pelicans now rely heavily on these types of structures for roost sites in California (Jaques *et al.* 1996). Few roosts along the mainland fall under the jurisdiction of natural resource agencies, and several major roost sites on privately owned structures have been lost in recent years. The most frequent cause of this disturbance is recreational activities and the most heavily disturbed habitats used by pelicans are estuaries (Jaques and Anderson 1988).

Roost site *creation* would fill in gaps in the availability of large capacity, high quality roosts along the Southern California coastline. Potential activities would include placing a large barge or roosting structure in the outer Santa Barbara Harbor, placing artificial roosting structures in different lagoons such as Agua Hedionda and others. Roost Site *enhancement* would be designed to increase the capacity and quality of existing roost sites. Potential actions would include adding rock riprap to the tops of selected jetties and breakwaters where pelican use is limited by high tides and large waves. Potential sites include Zuniga Point jetty, Channel Islands Harbor breakwater and Ventura Harbor breakwater. Roost site *protection* would be aimed at reducing human disturbance at selected coastal wetlands, breakwaters, jetties and offshore rocks through educational outreach panels and signs. Installation of fence barriers to prevent disturbance of favored pelican roost habitat at the tips of selected jetties would be considered if there were support from the local harbor districts. Potential sites include the Santa Clara River mouth, Malibu Lagoon, Ventura Harbor, Channel Islands Harbor and the outer tips of King Harbor, Dana Point and Oceanside Harbor.

Rating Criteria

1. Nexus **Rating: High**

Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Brown Pelican eggs due to DDT contamination (Kiff 1994).

✓ Location

Potential sites for this restoration idea are located within the SCB.

2. Feasibility **Rating: Med**

✓ Technical issues:

The success of artificial roost sites is unknown. However, pelicans would readily roost on artificial structures if undisturbed. The American Trader Trustee Council is implementing a similar project at San Diego Bay National Wildlife Refuge using an artificial platform. The results of the American Trader project could be used to refine the methodology for artificial roost sites. Increasing the height of jetties would be technically feasible. Actions to protect pelicans, such as erecting signs and outreach panels, would be technically feasible and sound.

✓ Operational/Sustainability issues:

There could be long–term maintenance and sustainability issues depending on the type of structure or improvement. Signs and panels might need on-going maintenance.

✓ Regulatory issues:

Some permitting and regulatory issues may be involved, especially if placing signs at and restricting access to certain breakwaters or harbors.

3. Benefits to Injured Resources or Lost Services **Rating: High**

✓ Duration:

Benefits should be long-term as long as structures were functional and signs/fences were present.

✓ Are benefits measurable?

Benefits could be measured by documenting the number of pelicans utilizing the artificial structures. Documenting the success of education/outreach would be difficult.

✓ What are the benefits in the absolute sense?

Improvements in the existing network of communal roosts along the coast would have a positive influence on the energy budgets of pelicans by reducing energy costs associated with: 1) commuting between prey and roosts; 2) flushing and relocating due to human disturbance; and 3) use of sub-optimal microclimates within roosts. Costs of migration would also be reduced by increased availability, quality and capacity of stopover sites. Cumulative energy reductions should result in improved body condition of individual birds. Expected population-level effects from improving the condition of individual birds would include increased juvenile and adult survival, and increased reproductive success of pelicans in California. Juvenile survival and adult reproductive success are the primary life history parameters affecting the California Brown Pelican population (Anderson and Gress 1983).

✓ Conservation Status?

Although California Brown Pelican populations have recovered substantially since their dramatic decline decades ago, they are still a Federally Endangered species and a high priority for restoration efforts.

4. Ecosystem Benefits **Rating: Low**

This restoration idea would entail habitat improvements that may benefit multiple species (cormorants, gulls and other species that may roost on artificial structures); however, the focus would be to benefit Brown Pelicans.

Create/Enhance/Protect Brown Pelican Roost Habitat Total Tier 1 Rating: **High**

Category: Seabirds **Number: 7**

Idea: **Implement Entanglement Reduction and Outreach Program to Protect Seabird Populations**

Source: Bird Technical Workshop, American Trader Restoration Plan

Summary Description

This restoration idea would primarily benefit the California Brown Pelican. Entanglement in fishing line and hooking of pelicans by fishers is a major factor affecting Brown Pelican survival. This restoration idea aims to reduce entanglement of Brown Pelicans and other seabirds in fishing line by educating anglers in ways to minimize negative interactions with seabirds while fishing.

Most avid recreational anglers have at some point interacted with seabirds while fishing along our coast. Seabirds may eat the same fishes being targeted or may be attracted to bait at the end of fishing lines. As a result, they can accidentally be hooked or entangled. The entanglement situation is not resolved when the line breaks and the seabird flies away. Both hooks and broken lines can still injure and kill seabirds. Hooks penetrate the bird's hollow bones and can lead to infection. Broken lines can wrap around legs, wings, or beaks and result in death due to starvation or inability to fly or swim.

Entanglement reduction and outreach would involve expanding the American Trader Trustee Council's (ATTC) Seabird Entanglement Education and Outreach Program to problematic fishing piers and wharfs in Los Angeles, Orange, and San Diego counties. The goal would be to provide information in the form of brochures, signs, and wildlife guides that heighten public awareness about the potential hazards to the California Brown Pelican and other seabird species vulnerable to being hooked by fishing tackle or entangled by monofilament line. Additionally, information would be provided about the impacts of human disturbance to seabird breeding colonies (i.e., nest abandonment) and measures that can be taken to avoid such disturbances. A similar program has been developed by the ATTC for sites in Santa Barbara and Ventura County. Designs and materials from the ATTC program and could be adapted to address sites in Los Angeles, Orange, and San Diego Counties. This restoration idea would entail the production of a minimum of 10 signs, which would be placed at problem areas to educate anglers about ways to reduce hooking birds and what to do if one was hooked.

Rating Criteria

1. Nexus **Rating: High**

Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Brown Pelican eggs due to DDT contamination (Kiff 1994).

✓ Location

The restoration idea would be implemented at fishing piers and wharfs in Los Angeles, Orange, and San Diego counties, within the SCB.

2. Feasibility **Rating: High**

✓ Technical issues:

Actions would be modeled after ATTC program, and would be feasible and sound.

✓ Operational/Sustainability issues:

After implementation, there would be minimal ongoing maintenance issues aside from sign maintenance and restocking brochures. For the ATTC project, the local city and county are responsible for sign maintenance.

✓ Regulatory issues:

There would be relatively few regulatory issues. Approval may be necessary from local cities, counties and harbor districts to gain approval to install signs.

3. Benefits to Injured Resources or Lost Services **Rating: Med**

✓ Duration:

Benefits would be long-term as long as education efforts continued.

✓ Are benefits measurable?

It is difficult to measure the effectiveness of educational and outreach programs. Public feedback and reaction would be the primary means of monitoring the success of educational activities. These programs would continually evolve and be updated to keep the information current.

✓ What are the benefits in the absolute sense?

The restoration idea would involve promoting public awareness, thus reducing bird injuries and deaths. When successful, these efforts would aid in assuring that the on-going recovery of injured seabird populations were not hampered by conflicts with anglers. Furthermore, to the extent that pelican entanglement decreased, the need for emergency closures to pier fishing would be reduced.

✓ Conservation Status?

Although California Brown Pelican populations have recovered substantially since their dramatic decline decades ago, they are still a Federally Endangered species and a high priority for restoration efforts.

4. Ecosystem Benefits **Rating: Med**

Although actions would be targeted to directly benefit Brown Pelicans, they would also benefit other seabird species that are at risk from entanglement in fishing line and human disturbance.

Implement Entanglement Reduction and Outreach Program to Protect Seabird Populations

Total Tier 1 Rating: **High**

Category: Seabirds **Number: 8**

Idea: **Restore Ashy Storm-Petrels to Anacapa Island**
Source: Bird Technical Workshop

Summary Description

This restoration idea would entail increasing the number of breeding Ashy Storm-petrels on Anacapa Island by using sound devices to attract them. Ashy Storm-petrels are not known to currently nest on Anacapa Island, but were mist-netted on the island in 1994. Within the Channel Islands, Ashy Storm-petrels are currently breeding on San Miguel, Santa Cruz, Santa Barbara, Santa Catalina, and San Clemente Island.

The use of recording to increase the capture rate of Ashy Storm-petrel in mist nets has been successful. Recordings would be played at night during the breeding season at areas that contain suitable nesting habitat. A monitoring component would be included.

The use of artificial nest boxes could also be employed for the Ashy Storm-petrel. The birds readily use artificial nest boxes, as demonstrated on the Farallon Islands.

Rating Criteria

1. Nexus **Rating: High**

Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Ashy Storm-petrel eggs due to DDT contamination (Kiff 1994).

✓ Location

Anacapa Island is located within the Channel Islands National Park, within the SCB.

2. Feasibility **Rating: Med**

✓ Technical issues:

The use of sound as an attractant would be technically feasible, and has been successful in previous efforts to establish seabirds in unoccupied habitat. The use of recordings to increase the capture rate of the Ashy Storm-petrel in mist nets has been successful. A successful program to attract petrels was conducted in the Galapagos using sound and playback systems. Ashy Storm-petrels have also been successfully captured using sound attractants on Scorpion Rock in the Channel Islands National Park (Josh Adams, personal comm.).

✓ Operational/Sustainability issues:

The recent efforts undertaken to eradicate non-native rats on Anacapa would likely contribute to the success of this effort by increasing the breeding success of the birds once they established themselves on the island.

✓ Regulatory issues:

Permits would need to be secured from the NPS.

3. Benefits to Injured Resources or Lost Services **Rating: High**

✓ Duration:

Benefits are anticipated to be long-term once birds were established on Anacapa Island.

✓ Are benefits measurable?

Yes. Post-monitoring data would indicate any success.

✓ What are the benefits in the absolute sense?

This restoration idea would entail attracting Ashy Storm-petrels to Anacapa, where they are currently not known to nest. This effort would attempt to encourage nesting on Anacapa Island, thereby increasing the distribution of the birds within the Channel Islands.

✓ Conservation Status?

The Ashy Storm-petrel is Bird of Conservation Concern (FWS 2002) and is a high priority species for restoration efforts.

4. Ecosystem Benefits **Rating: Low**

The use of sound would only target Ashy Storm-petrels. There would not be any ecosystem benefits.

Restore Ashy Storm-Petrels to Anacapa Island Total Tier 1 Rating: **High**

Category: Seabirds **Number: 9**

Idea: **Restore Ashy Storm-Petrels on Southeast Farallon Island**
Source: Point Reyes Bird Observatory, US Fish and Wildlife Service

Summary Description

This restoration idea is a combination of two submitted ideas. The purpose would be to increase the number of breeding Ashy Storm-petrels on Southeast Farallon Island by creating habitat from abandoned concrete and eradicating non-native house mice. Mice are egg predators; however, their biggest effect on the Ashy Storm-petrel is through indirect predation by burrowing owls (i.e., the presence of mice on the island attracts burrowing owls, which also predate on Ashy Storm-petrels). On Southeast Farallon Island, over-wintering owls are thought to cause significant mortality to the Ashy Storm-petrel population and have a lesser impact on Cassin's Auklet populations as well. Each October, young burrowing owls stop off on the Farallons during migration, at a time when the house mouse population peaks there. Because of the abundant food source provided by the mice, the owls choose to stay at the island for the winter; under normal circumstances they would continue migrating to more favorable wintering locations. Once winter rains set in the mouse population crashes and the owls are forced to seek other prey. Because this coincides temporally with the arrival of Ashy Storm-Petrels and Cassin's Auklets to excavate ground nest sites, the owls switch to eating these seabirds. The removal of the mice would hopefully reduce the presence of the burrowing owls and consequent predation pressure on nesting seabirds.

Ashy Storm-petrel habitat would be created by constructing rock walls out of broken concrete to create nesting cavities. This structure would be similar to the Cassin's Auklet/Pigeon Guillemot structure installed on Southeast Farallon Island in August of 2000. The structure would create nesting habitat for Ashy Storm-petrels, but would also allow access for biologists to observe and band chicks. The structure would have solar powered audio and video monitoring and sound-making apparatus to attract Ashy Storm-petrels. A monitoring program for the habitat creation component would be implemented using standard monitoring protocols. The monitoring would focus on pre- and post-implementation changes in reproductive parameters, and colonization of newly created habitat.

The mouse eradication would be completed in several phases, including a pilot study to identify a feasible means to control mice, a study of the annual cycle of the island mouse population to determine timing for control, the preparation of a mouse control plan, and implementation of the control plan. Methods would include bait stations and the development of a broadcast method to ensure that every mouse territory received bait. Bait would be broadcast either by hand or by aerial means, and would target an even density of one pellet per square meter. The rodenticide brodifacoum offers the highest probability of success for removing mice from the island. Timing of the eradication would consider mice population cycles, weather, and presence of sensitive or breeding wildlife. A Rodent Re-Introduction Prevention Plan would also be developed. A monitoring program would be developed to monitor any signs of mice activity.

Rating Criteria

1. Nexus **Rating: Med**

Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Ashy Storm-petrel and Cassin's Auklet eggs due to DDT contamination (Kiff 1994).

✓ Location

The Farallon Islands are located 28 miles west of San Francisco, outside of the SCB. The Farallon National Wildlife Refuge supports the largest breeding population of the Ashy Storm-petrel. Long-term banding studies on the Farallon Islands show that there is an interchange of breeding individuals from the Channel Islands to the Farallon Islands.

2. Feasibility **Rating: Med**

✓ Technical issues:

Both the habitat creation and mice eradication components of this idea would employ proven methods/ techniques that have clearly demonstrated success in the past. Concrete for habitat structure would be available on the island.

Mice have been removed from islands worldwide. The areas of steep topography on the Farallons would present a technical challenge. However, established techniques that have been used in other successful eradication projects would be used here as well. Some follow-up application might be necessary if mice were not fully eradicated.

✓ Operational/Sustainability issues:

Moderate Operations and Maintenance would be required for mice eradication component. Rodenticide might need to be applied more than once. Minimal maintenance would be expected for habitat structure (e.g., annual cleaning).

✓ Regulatory issues:

Permits would be required. There might be public resistance that would require outreach and education. If the burrowing owl is listed, additional regulatory steps would be required. Both components are consistent with the goals of the Farallon National Wildlife Refuge.

3. Benefits to Injured Resources or Lost Services **Rating: High**

✓ Duration:

Benefits are anticipated to be long-term under the assumption that the island remained mouse-free.

✓ Are benefits measurable?

Yes. There are 30 years of seabird breeding population and productivity data collected from Southeast Farallon Island. Post-implementation monitoring would allow benefits to be measured.

✓ What are the benefits in the absolute sense?

Ashy Storm-petrels and Cassin's Auklets would receive direct benefits through the creation of additional habitat. This effort would likely lead to increased reproductive output and recruitment. Benefits would be long-term due to the permanent nature of the constructed wall. These species have been in decline on the Farallon Islands and such restoration would likely help recover their populations. Mouse removal would also benefit these species by removing an attractive prey species for the burrowing owl. Mouse removal might also indirectly benefit other seabirds by limiting the spread of introduced plants known to degrade seabird nesting habitat. The effects could be long-term if mice are successfully prevented from re-colonizing the islands.

✓ Conservation Status?

Ashy Storm-petrels and Cassin's Auklets are Birds of Conservation Concern (FWS 2002). These species are of high priority for restoration efforts.

4. Ecosystem Benefits **Rating: Med**

This restoration idea would entail habitat improvement and the removal of an exotic species. These actions would provide benefits to the island ecosystem and would benefit multiple species. Ideas that have an ecosystem-level benefit within the SCB would rate as high. However, since implementation is outside of the SCB, it will rate as a medium.

Restore Ashy Storm-Petrels on Southeast Farallon Island

Total Tier 1 Rating: **Med**

Category: Seabirds **Number: 10**

Idea: **Create Mainland Nesting Habitat for Colonial Seabirds**
Source: US Fish and Wildlife Service

Summary Description

This restoration idea would entail creating nesting habitat for Elegant Terns, Royal Terns, and Black Skimmers. There is currently minimal nesting habitat available for these birds, in part because some of the suitable sites are managed for the endangered California Least Tern. The Elegant Tern has a very restricted distribution. Only 5 recently active breeding colonies are known: Isla Rasa in the Gulf of California (with around 22,500 pairs, 90% or more of the known population), Isla Montague in the Colorado delta, San Diego Bay Saltworks site, Bolsa Chica in Orange County, and Pier 400 in the Los Angeles harbor. The Pier 400 site is a new colony, founded in 1998 most likely by birds relocating from San Diego Bay and/or Bolsa Chica. This idea suggests creating additional nesting habitat at either the Bolsa Chica or Saltworks site.

Bolsa Chica: The design plans for the restoration of Bolsa Chica currently include the construction of 3 new nesting islands to encourage nesting by terns and skimmers. Construction is anticipated to begin in 2004 and may be completed by Spring 2005. Implementation would involve contributing funds directed at the construction and/or maintenance of the nesting islands.

Saltworks: The Saltworks site in San Diego Bay is a regionally important nesting location for colonial mainland nesting seabirds, including California Least Terns, Elegant Terns, Royal Terns, and Black Skimmers. There is a need at the Saltworks to improve the nesting substrate for seabirds. Currently the substrate cakes onto the wingtips and feet of the birds and impairs their foraging and movement. The hardening of the substrate on the wings can result in feathers breaking and eggs are sometimes hardened into position and unable to be rotated. In addition to improving the substrate, additional habitat could be created by widening and consolidating the nesting areas. The South San Diego Bay Refuge is currently developing a management plan for the site. One of the primary objectives of the current plan is to create additional nesting habitat. The plan will be out for public review in 2004. There are currently no funds for implementation of the habitat improvements.

Rating Criteria

1. Nexus **Rating: Med**

The 3 target species would be Elegant Terns, Royal Terns, and Black Skimmers. These species are breeding seabirds in the SCB, but we are not aware of data that demonstrates these species experienced severe (>15%) eggshell thinning due to DDT contamination.

✓ Location

This restoration idea addresses areas within coastal mainland sites of the SCB.

2. Feasibility **Rating: Med**

✓ Technical issues:

The construction of artificial nesting sites would be technically feasible and has been successful in the past for nesting terns and skimmers.

✓ Operational/Sustainability issues:

Habitat would likely need to be maintained to keep it in an optimal state for nesting. Weed clearing is typically performed at nesting sites. Both sites considered would be within permanently protected areas.

✓ Regulatory issues:

The Bolsa Chica project is an off-the-shelf project with environmental permitting and review complete. The Saltworks site is located within a National Wildlife Refuge. The creation and enhancement of nesting habitat at the site would be supported by the Refuge.

3. Benefits to Injured Resources or Lost Services **Rating: High**

✓ Duration:

Creating additional nesting habitat within protected areas would have long-term permanent benefits to these species.

✓ Are benefits measurable?

Yes. Post-implementation monitoring data would be collected to determine use of nesting sites and in comparisons against baseline information.

✓ What are the benefits in the absolute sense?

Nesting habitat is a limiting factor for most mainland colonial seabirds. Creation of new habitat would significantly benefit mainland nesting terns and skimmers.

✓ Conservation Status?

The Black Skimmer and Elegant Tern are both Birds of Conservation Concern (FWS 2002) and are high priorities for restoration efforts. The Royal Tern is considered a moderate priority for restoration efforts.

4. Ecosystem Benefits **Rating: Med**

The creation of additional nesting habitat would benefit multiple species.

Create Mainland Nesting Habitat for Colonial Seabirds Total Tier 1 Rating: **Med**

Category: Seabirds **Number: 11**

Idea: **Create Cormorant Nesting Platforms**
Source: 1994 Carter and Gress Report

Summary Description

This restoration idea would aim to create additional nesting habitat for cormorant species, in particular the Double-crested Cormorant. The structure could either be a floating barge or an anchored structure. Nest platforms would be constructed in corners of the structure. The structure would be designed in such a way as to maximize areas for nesting platforms. The structure would be located in relatively sheltered areas with low levels of human disturbance. Areas for consideration include Los Angeles Harbor (such as near the Navy Mole site or California Least Tern shallow water mitigation areas), coastal lagoons in San Diego County (ex. Buena Vista Lagoon, Batiquitos Lagoon, San Elijo Lagoon), and Orange County (Bolsa Chica).

Rating Criteria

1. Nexus **Rating: High**

Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Double-crested, Brandt's, and Pelagic Cormorant eggs due to DDT contamination (Kiff 1994).

✓ Location

Potential locations would be located within the coastal areas of the SCB.

2. Feasibility **Rating: Med**

✓ Technical issues:

Artificial structures for cormorants have been successful in the past. Design would incorporate features of other successful structures. The creation of artificial platforms is a sound and proven method for increasing nesting habitat.

✓ Operational/Sustainability issues:

Maintenance of the structure would depend on type of material used. However, periodic maintenance would likely be needed to keep structure fully functional.

✓ Regulatory issues:

Approval would be necessary from landowners and some permitting would be required. However, structures would be targeted in areas that do not conflict with human recreational or commercial activities.

3. Benefits to Injured Resources or Lost Services **Rating: Med**

✓ Duration:

Benefits would be long-term as long as structure was maintained.

✓ Are benefits measurable?

Yes. Monitoring would measure benefits by documenting the number of cormorants utilizing the artificial structures.

✓ What are the benefits in the absolute sense?

Cormorants would benefit by having increased nesting habitat. Loss of coastal areas has limited cormorant nesting opportunities in Southern California. Implementing this idea would increase nesting opportunities, which could translate into an increase in population numbers.

✓ Conservation Status?

Cormorants are a moderate priority for restoration efforts.

4. Ecosystem Benefits **Rating: Low**

This idea would largely target cormorants. Other species such as pelicans might also use the structure, but it would be designed specifically to maximize benefits to cormorants.

Create Cormorant Nesting Platforms

Total Tier 1 Rating: **Med**

Category: Seabirds **Number: 12**

Idea: **Fund Brown Pelican Patrol/Enforcement Position**
Source: US Fish and Wildlife Service, International Bird Rescue Research Center

Summary Description

Loren Hays Idea: This restoration idea would entail funding a position that would patrol coastal waters from Ventura to San Diego. The position would monitor Brown Pelican disturbance and assist with any pelicans that needed pick-up. This position could be a warden for CDFG or a staff member at a wildlife care center. The presence of this person would hopefully deter and minimize harassment of pelicans. In 2003, numerous pelicans were found mutilated in Los Angeles and Orange Counties. The presence of an enforcement officer might serve to deter such incidences in the future.

IBBRC Idea: This idea would entail protecting Brown Pelicans and other seabirds from unnecessary injury and death through rescue, rehabilitation and education. The IBBRC consistently receives Brown Pelicans with fishing line/hook injuries throughout the year. However, by the time some of the birds arrive at the IBRRC, their health has greatly deteriorated and many of the birds are euthanized. The Pelican Patrol would proactively search for and rescue injured Brown Pelicans so they could be rehabilitated faster and have a greater chance of survival. Brown Pelicans would be the focus of the rescue patrols, but other native injured aquatic bird species such as cormorants and Western Grebes would be aided as well.

The Pelican Patrol would rely initially on boat patrols. The IBBRC already has a small zodiac for patrol duties, but it would need to be repaired. Injured birds would be taken the Los Angeles Oiled Bird and Education Center that has proper flight aviaries in place and a rehabilitation staff with expertise in rehabilitating aquatic birds.

The IBRRC idea would also include an educational outreach campaign targeted at the general public, recreational fishermen, bait barge operators, charter boat operators and pier managers. The goal of the campaign would be to educate the public about the effects of fishing hooks and lines on birds in order to minimize injuries in the future. The public education campaign could consist of public service announcements, articles, ads, signs, exhibits, and lectures. IBRRC would use its own public relations and education staff to administer a public relations campaign in English and Spanish. Additional materials could be provided for this existing program. This component is similar to the Entanglement Reduction Program proposed in Idea #8.

Rating Criteria

1. Nexus **Rating: High**

Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Brown Pelican eggs due to DDT contamination (Kiff 1994).

✓ Location

Loren Hays Idea: The position would patrol coastal waters from Ventura to San Diego, within the SCB.

IBBRC Idea: The implementation area of the Pelican Patrol would initially include Los Angeles Harbor (San Pedro Bay), but would be expanded to include other areas in the SCB, as deemed necessary.

2. Feasibility **Rating: Med**

✓ Technical issues:

Establishing a patrol position would be technically feasible. According to the IBBRC, similar patrols have been established in Australia, Florida, and San Diego. The educational outreach component of this idea would also be feasible.

✓ Operational/Sustainability issues:

Operational issues would include maintenance of boat and equipment.

✓ Regulatory issues:

The Pelican Patrol person would need necessary permits to handle Brown Pelicans and other birds. Also, the patrol would have to coordinate with any necessary entities (e.g., Port of LA) for access issues.

3. Benefits to Injured Resources or Lost Services **Rating: Med**

✓ Duration:

The benefits of the rescue component would last as long as the Patrols continued. It is anticipated that pelicans brought in by the Patrol would have a higher survival rate because of a faster rescue time. The educational outreach component could have longer lasting benefits to Brown Pelicans by reducing the long-term risk of fishing hook injury.

✓ Are benefits measurable?

The number of rescued birds could be measured and compared against previous data from the Los Angeles Oiled Bird & Education Center. As part of the research, a baseline study could be conducted and statistics from previous years compared to those from current and subsequent years.

On the outreach side, surveys and observational studies could measure behavioral changes in the recreational fishing industry and general community. However, this would be more difficult to measure.

✓ What are the benefits in the absolute sense?

Pelicans are constantly getting injured by fishing hooks. The Pelican Patrol could facilitate the rescue and increase the response time to these injuries, thereby decreasing the number of Brown Pelican fatalities. The Patrol could also act as a deterrent if the public was aware it was unlawful to harass pelicans, as well as an educational tool for other fisherman and the general public about the negative effects of fishing hooks and disturbance to Brown Pelicans.

✓ Conservation Status?

Although California Brown Pelican populations have recovered substantially since their dramatic decline decades ago, they are still a Federally Endangered species and a high priority for restoration efforts.

4. Ecosystem Benefits **Rating: Med**

The Patrol would primarily benefit Brown Pelicans, but could also benefit other seabirds, including cormorants. It could also note disturbance to other marine resources, such as marine mammals. However, the idea specifically emphasizes birds and would not have ecosystem level benefits.

Fund Brown Pelican Patrol/Enforcement Position

Total Tier 1 Rating: **Med**

Category: Seabirds **Number: 13**

Idea: **Enhance Nesting Habitat for Shearwaters in New Zealand**
Source: Bird Technical Workshop, US Geological Survey

Summary Description

This idea would involve enhancing nesting habitat in New Zealand for shearwaters by removing introduced predators. Implementation would be very similar to the rat eradication idea for San Miguel (i.e., broadcasting rodenticide throughout breeding colonies). Shearwaters use the SCB during their migration but breed on islands in New Zealand. Introduced predators are known to severely impact breeding success of these species at their nesting colonies. Increasing productivity at the breeding colonies would translate to an increased number of birds using the SCB.

Rating Criteria

1. Nexus **Rating: Low**

These seabirds utilize the SCB during the non-breeding season. We are not aware of data that demonstrates these species experienced severe eggshell thinning due to DDT contamination.

✓ Location

Species do not breed in the SCB, but use the area during migration and the non-breeding season. Thus, enhancement would occur on breeding habitat outside the SCB.

2. Feasibility **Rating: Med**

✓ Technical issues:

Eradication methodologies have been developed and tested worldwide, including the Anacapa Island Rat Eradication Project. A specific methodology would be developed based upon the success of previous projects.

✓ Operational/Sustainability issues:

An on-going prevention program would be required to ensure predators do not re-colonize islands.

✓ Regulatory issues:

Certain permitting and compliance issues would have to be addressed. These issues might be less complex in New Zealand, but implementation could be more complicated due to distance. There would be potential accountability issues regarding use of settlement funds outside of the U.S., but this has already been done by the American Trader Trustee Council in Mexico. The Command Trustee Council has included this idea in their draft Restoration Plan that was released in early 2004.

3. Benefits to Injured Resources or Lost Services **Rating: High**

✓ Duration:

Benefits would be long-term as long as islands remained predator-free.

✓ Are benefits measurable?

Yes, monitoring could document any increased productivity.

✓ What are the benefits in the absolute sense?

Removal of predators at nesting colonies would result in increased productivity that would increase overall population.

✓ Conservation Status?

No special status for these species. However, Sooty Shearwaters have been reported to be in decline.

4. Ecosystem Benefits **Rating: Med**

Although crevice nesting seabirds would be targeted directly, the entire island ecosystem would also benefit from removal of non-native predators from the ecosystem, which would allow the island system to return to normal. However, only a couple of species that use the SCB would benefit. Ideas that have an ecosystem-level benefit within the SCB would rate as high. However, since implementation would be outside of the SCB, it will rate as a medium.

Enhance Nesting Habitat for Shearwaters and in New Zealand

Total Tier 1 Rating: **Med**

Category: Seabirds **Number: 14**

Idea: **Reintroduce Tufted Puffins to Prince Island**
Source: Bird Technical Workshop

Summary Description

Tufted Puffins once bred at Prince Island (near San Miguel), Santa Barbara Island, and Santa Cruz Island during the late 1800s. They were extirpated from this southern part of their range in the 1900s. The species recently re-colonized Prince Island (McChesney *et al.* 1995). This idea aims to augment the population on Prince Island by direct reintroduction of Tufted Puffins. This could be carried out in 2 phases: 1) an attraction program, and 2) an active reintroduction of individuals. The first phase would involve the use of decoys and other attractants. The second would involve transplanting young tufted puffins from northern breeding colonies (e.g., Alaska) to Prince Island. The puffins would have to be reared in burrows. Decoys could also be used to attract birds to Prince Island. All released puffins would be banded and a monitoring program would be established. The goal would be to have puffins returning to the Prince Island to breed several years later.

A similar project, Project Puffin, has been carried out at historic nesting islands in the Gulf of Maine. Between 1973 and 1986, 954 young Atlantic puffins were transplanted from Great Island to Eastern Egg Rock and 914 of these successfully fledged. Young puffins were transplanted when they were about 10-14 days old. The young puffins were reared in artificial sod burrows for about one month. Biologists placed handfuls of vitamin-fortified fish in their burrows each day.

Rating Criteria

1. Nexus **Rating: Med**

Tufted Puffins currently breed in small numbers on Prince Island. We are not aware of data that demonstrates this species experienced severe eggshell thinning due to DDT contamination.

✓ Location

Prince Island is located off of San Miguel Island within the SCB.

2. Feasibility **Rating: Med**

✓ Technical issues:

Atlantic Puffins have successfully been reintroduced on the east coast. It is assumed that similar techniques would be feasible and successful for Tufted Puffins.

✓ Operational/Sustainability issues:

Annual decoy maintenance would be required until the colony was established.

✓ Regulatory issues:

Permits would be required. Approval from the National Park Service would also be needed.

3. **Benefits to Injured Resources or Lost Services** **Rating: Med**

✓ Duration:

Tufted Puffins exhibit site fidelity and it is expected that translocated birds would return to Prince Island to breed. Successful re-colonization is expected to have long-term benefits to the species.

✓ Are benefits measurable?

Yes. Post-implementation monitoring would document any success.

✓ What are the benefits in the absolute sense?

Prince Island is at the southernmost end of the range for the Tufted Puffin. Although there were small colonies historically, the re-establishment of Tufted Puffins on Prince Island would not significantly benefit the species as a whole. However, it would re-establish birds at the southern edge of its range.

✓ Conservation Status?

The Tufted Puffin is a moderate priority species for restoration efforts.

4. **Ecosystem Benefits** **Rating: Low**

This restoration idea specifically focuses on the reintroduction of one species.

Reintroduce Tufted Puffins to Prince Island Total Tier 1 Rating: **Med**

Category: Seabirds **Number: 15**

Idea: **Purchase Bird Rock off Santa Catalina Island**
Source: Bird Technical Workshop

Summary Description

This restoration idea would involve purchasing Bird Rock, a 1.3-acre rock located approximately 500 yards off Catalina Island. The land has been appraised by Los Angeles County for $3,800. It is privately owned by Michael Caffey and is currently for sale for $2.75 million. There have been no offers for the property; however, the Catalina Marine Science center is interested in purchasing it. The Santa Cruz Island Foundation has offered to take title of the island.

Bird Rock supports nesting Western Gulls and the rare plant Malva Rosa. Brown Pelicans, cormorants, and Great Blue Herons also use Bird Rock but do not nest on the island. The sea life around Bird Rock is very diverse and it is a popular spot for scuba diving. Bird Rock is also an attraction for kayakers.

Rating Criteria

1. Nexus **Rating: High**

Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Western Gull and Brown Pelican eggs due to DDT contamination (Kiff 1994).

✓ Location

Bird Rock is located off the northwest corner of Catalina Island in Isthmus Cove, within the SCB.

2. Feasibility **Rating: Med**

✓ Technical issues:

It would be technically feasible to acquire this island.

✓ Operational/Sustainability issues:

Once the purchase was complete, there would be little operational maintenance. However, there is a high level of human disturbance around the island and visitors would occasionally set foot on the island.

✓ Regulatory issues:

There would be minor regulatory issues since the intent of the purchase is to keep the island undisturbed. A permanent conservation easement could be placed on the land.

3. Benefits to Injured Resources or Lost Services **Rating: Low**

✓ Duration:

Any benefits from the purchase of the island would be long-term since it would result in permanent protection of the island.

✓ Are benefits measurable?

Benefits would be difficult to measure; however, surveys could give indication of bird use of the island.

✓ What are the benefits in the absolute sense?

There would be little overall benefit to seabirds. Birds on this island are often disturbed due to the high level of human activity (kayaking, scuba) that would be challenging to control or minimize, regardless of ownership. It is unlikely that this island would be sold and developed in the future. Thus, purchase of this island would not likely prevent future habitat degradation.

✓ Conservation Status?

Although California Brown Pelican populations have recovered substantially since their dramatic decline decades ago, they are still a Federally Endangered species and a high priority for restoration efforts.

4. Ecosystem Benefits **Rating: Low**

The permanent protection of Bird Rock would provide benefits to several seabirds. However, given how unlikely it is that Bird Rock would ever be developed, these species would not receive greater benefit than from the current situation. A more practical solution would be putting signs around the island that might prevent people from walking on the island and disturbing birds.

Purchase Bird Rock off Santa Catalina Island Total Tier 1 Rating: **Med**

Category: Seabirds **Number: 16**

Idea: **Create GIS Atlas of Brown Pelican Roost Sites**
Source: American Trader Restoration Plan

Summary Description

This restoration idea stems from a project funded by the American Trader Trustee Council to create a GIS based atlas showing the locations of Brown Pelican roost sites along the mainland. The atlas has been created for Ventura County south to San Diego County. This idea would involve funding the completion of the atlas for the remaining range of the Brown Pelican in California. This atlas could be used by federal and state agencies for planning purposes.

Rating Criteria

1. Nexus **Rating: Med**

Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Brown Pelican eggs due to DDT contamination (Kiff 1994).

✓ Location

The targeted areas, Ventura County north to San Francisco Bay area, lie outside of the SCB.

2. Feasibility **Rating: Med**

✓ Technical issues:

The creation of the atlas would be technically feasible and has been done before.

✓ Operational/Sustainability issues:

The atlas would have to be updated periodically to reflect any changes in roost site locations.

✓ Regulatory issues:

Permits would not be required.

3. Benefits to Injured Resources or Lost Services **Rating: Low**

✓ Duration:

Benefits would last 5-10 years if the atlas were not updated.

✓ Are benefits measurable?

It would be difficult to measure benefits because the atlas would be a planning tool.

✓ What are the benefits in the absolute sense?

Updated information would be provided to the public regarding Brown Pelican roost sites, including jurisdiction, seasonal use patterns, and detailed maps for planning purposes. An atlas would allow planners to identify sensitive roost habitat and avoid disturbance of these areas. An atlas would also be beneficial during oil spills to help identify sensitive areas. While it would be beneficial to have this information collated in one document, it would not result in on-the-ground restoration for the Brown Pelican. There would not likely be a significant benefit to the species.

✓ Conservation Status?

Although California Brown Pelican populations have recovered substantially since their dramatic decline decades ago, they are still a federally endangered species and a high priority for restoration efforts.

4. Ecosystem Benefits **Rating: Low**

This effort would largely benefit pelicans, but could also benefit cormorants or other species that may also roost at the same sites.

Create GIS Atlas of Brown Pelican Roost Sites Total Tier 1 Rating: **Med**

Category: Seabirds **Number: 17**

Idea: **Enhance Nesting Habitat for Grebes and Loons in Northern California**

Source: Bird Technical Workshop, American Trader Restoration Plan

Summary Description

The goal of this restoration idea would be to increase Western and Clark's Grebe populations by minimizing human disturbances at important nesting colonies. Western and Clark's Grebes breed on the edges of inland lakes and largely winter offshore along the Pacific Coast, including the SCB. Currently, human disturbance is a significant factor threatening grebe colonies during the nesting season. Since many of the major breeding areas lie within areas of substantial human recreation, they are frequently impacted by human disturbance. Activities under this category might include placing permanent buoys to protect nesting areas susceptible to disturbance, production of leaflets and pamphlets to educate the public about ways to avoid disturbance, and potentially funding trained personnel to oversee colony protection.

Rating Criteria

1. Nexus **Rating: Low**

We are not aware of data that demonstrates that these species experienced severe (>15%) eggshell thinning due to DDT contamination.

✓ Location

Location of implementation would be outside of SCB at breeding grounds for grebes.

2. Feasibility **Rating: Med**

✓ Technical issues:

These kinds of activities have been implemented successfully for other species. American Trader Trustee Council funded the production of a management plan for grebes that could assist in the development of specific restoration actions.

✓ Operational/Sustainability issues:

Implementation would require on-going efforts to be effective.

✓ Regulatory issues:

There could be regulatory issues with mosquito abatement and weed control agencies who conduct activities in nesting habitat or if access to areas is restricted.

3. Benefits to Injured Resources or Lost Services **Rating: Med**

✓ Duration:

Duration of benefits would be tied to the on-going implementation of actions.

✓ Are benefits measurable?

Yes. Efforts could monitor treated and untreated colonies and compare overall productivity.

✓ What are the benefits in the absolute sense?

Colonies are known to be impacted (eggs and chicks lost) by human disturbance at inland colonies. Reduction of this disturbance should result in increased productivity of colonies and overall increase in grebe population.

✓ Conservation Status?

These species do not currently have special status and are a low priority for restoration efforts.

4. **Ecosystem Benefits** **Rating: Low**

Reduction of disturbance should result in increased productivity of colonies and overall increase to grebe population. Other species that use these lakes would also benefit.

Enhance Nesting Habitat for Grebes and Loons in Northern California

Total Tier 1 Rating: **Low**

Category: Seabirds **Number: 18**

Idea: **Attract Common Murres to Prince Island**
Source: Bird Technical Workshop

Summary Description

This restoration idea would involve attracting Common Murres to Prince Island, located just north of San Miguel Island. This colony was previously occupied and represented the southern breeding limit known for the species in California. The colony disappeared in the early 20th century, possibly due to egg collection. The last egg record available for this colony is from 1912. Currently, a moderate number of murres are present in Southern California during the fall and winter. Small numbers are present during the summer.

A proven technique called social attraction would be employed. Attractants would include decoys of adult murres, chicks and eggs, CD players projecting amplified murre sounds, and three-sided mirror boxes. This technique creates the appearance of an active colony to induce murres to select the site as a nesting site. Implementation would also involve a success monitoring component.

Rating Criteria

1. Nexus **Rating: Low**

Common Murres currently do not breed in the SCB, but were extirpated from Prince Island in 1912. We are not aware of data that demonstrates this species experienced severe (>15%) eggshell thinning due to DDT contamination.

✓ Location

Prince Island is located off of San Miguel Island within the SCB.

2. Feasibility **Rating: Low**

✓ Technical issues:

Social attraction techniques have been successfully used to attract Common Murres. These techniques are proven and feasible.

✓ Operational/Sustainability issues:

Attraction is very uncertain at this point since there are so few murres that travel into the area and it has been over 90 years since birds last nested on Prince Island. Annual maintenance of the decoys would be required until the colony is established.

✓ Regulatory issues:

Permits would be required.

3. Benefits to Injured Resources or Lost Services **Rating: Med**

✓ Duration:

Because Common Murres tend to return to the location of their first mating, successful re-colonization would be expected to have long-term benefits to the species.

✓ Are benefits measurable?

Yes. Post-implementation monitoring would document any success.

✓ What are the benefits in the absolute sense?

Prince Island is at the southernmost end of the range for the Common Murre. Although a small colony existed historically, the re-establishment of Common Murres on Prince Island would not significantly benefit Common Murres. This species is wide-ranging, and a recovery action at the very southern edge of its range would not provide significant benefits to the species.

✓ Conservation Status?

The Common Murre is a moderate priority species for restoration efforts. Efforts are currently underway to restore Common Murres at several locations within its range.

4. Ecosystem Benefits **Rating: Low**

This idea would specifically focus on the reintroduction of one species.

Attract Common Murres to Prince Island

Total Tier 1 Rating: **Low**

Category: Seabirds **Number: 19**

Idea: **Attract Brown Pelican to Prince Island and Scorpion Rock**
Source: Bird Technical Workshop

Summary Description

This restoration idea would involve attracting Brown Pelicans to breed at Prince Island and Scorpion Rock in the Channel Islands. Decoys would be used to attract the birds back to their historic colonies. Colonial nesting birds such as Brown Pelicans are typically reluctant to re-colonize or colonize new habitat without the presence of co-specifics. The decoys would make it appear that there was an active colony present on the rocks and it was therefore safe for pelicans to re-colonize. Currently, Brown Pelicans only breed on West Anacapa, with a small number on Santa Barbara Island. If a breeding colony could be established on either of those two rocks, it would protect the population from being severely harmed if a catastrophic event happened on Anacapa. Restoration efforts would be modeled after the highly successful work on Devil's Slide Rock with murres, and work on the east coast with the restoration of tern and puffin habitat.

Rating Criteria

1. **Nexus** **Rating: Prince Island - High**
Scorpion Rock-High

Data collected in 1992 in the Southern California Bight demonstrated severe (>15%) eggshell thinning in Brown Pelican eggs due to DDT contamination (Kiff 1994).

✓ Location

Prince Island and Scorpion Rock are located within the SCB.

2. **Feasibility** **Rating: Prince Island - Med**
Scorpion Rock - Low

✓ Technical issues:

Social attraction has not been used with pelicans before. Steve Kress, a social attraction expert, indicated that he felt technique would likely be successful. Heavy human activity at Scorpion Rock by researchers and tourists (e.g., kayakers) would make successful breeding by pelicans unlikely. Scorpion Rock also has nest boxes for Cassin's auklets. Pelican attraction efforts should not interfere with breeding activities of Cassin's auklets or associated efforts to monitor these nest boxes.

✓ Operational/Sustainability issues:

On-going maintenance would be required, until the colony was determined to be self-sufficient.

✓ Regulatory issues:

Would require consent by the National Park Service.

3. **Benefits to Injured Resources or Lost Services** **Rating: Prince Island - Low**
Scorpion-Low

✓ Duration:

Benefits would be fairly long-term as long as birds were present.

✓ Are benefits measurable?

Yes, the presence of breeding pelicans would demonstrate success.

✓ What are the benefits in the absolute sense?

This restoration idea would focus largely on pelicans. Pelicans are not currently limited by breeding habitat on Anacapa and Santa Barbara. It is unknown how the population would benefit from moving to a new island, aside from spreading the population out. Because of the high levels of activity at Scorpion Rock, efforts at this location would likely not be beneficial to Brown Pelicans.

✓ Conservation Status?

Although California Brown Pelican populations have recovered substantially since their dramatic decline decades ago, they are still a Federally Endangered species and a high priority for restoration efforts.

4. **Ecosystem Benefits** **Rating: Prince Island - Low**
Scorpion-Low

This idea would focus on benefiting pelicans. Decoys would attract additional cormorants to roost and possibly breed on the rocks. There is the question of whether the pelicans need to be attracted to additional nesting sites. There does not appear to be limited breeding habitat on either Anacapa or Santa Barbara Island. It is unclear why birds have not nested on these islands on their own. A potential benefit would be that breeding colonies would be spread out in case of a catastrophic event. However, all the islands are relatively close to each other and most likely all would be affected by an event such as an oil spill.

Attract Brown Pelican to Prince Island and Scorpion Rock Total Tier 1 Rating: **Prince Island- Med**
Scorpion Rock- Low

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Fish/Fishing

MSRP Fish/Fishing Restoration Ideas

Tier 1 Results: ***Updated 7/28/04***

#	Fishing Restoration Project Ideas	Nexus	Feasibility	Benefit	Ecosystem Benefit	Total Score
1.	Construct Artificial Reefs: a. Construct Reefs that Enhance Kelp Forests b. Construct Reefs Around Existing Fishing Piers/Structures c. Construct Reefs and Improved Fishing Access to Them d. Construct Juvenile Fish Nursery Reefs	High	Med	High	High	High
2.	Provide Public Information that Promotes Wholesome Fishing and Fish Consumption	High	High	High	Med	High
3.	Restore Wetlands (several potential locations)	Med	High	Med	High	High
4.	Augment Funds for Implementing Marine Protected Areas (MPAs) in the Northern Channel Islands	Med	High	Med	High	High
5.	Operate Fishing Barge(s) over Existing or Constructed Reef(s)	High	Med	High	Low	Med[1]
6.	Create Protected Shallow-water Habitat a. Extend breakwaters at Los Angeles-Long Beach Harbors to create more protected shallow-water habitat b. Create more shallow-water habitat within existing deep-water areas of Long Beach Harbor or San Diego Bay	Med	Med	Med	Med	Med
7.	Supplement Near-shore Fisheries in Contaminated Areas with Clean, Hatchery-raised Fish	High	Med	Med	Low	Med
8.	Spotted Sand Bass Hatchery Program	Med	Med	Low	Low	Med
9.	Restore Depleted Kelp Beds of Malibu and Palos Verdes	High	Med	Low	Low	Med[1]
10.	Convert Decommissioned Oil Platforms to Artificial Reefs	Med	Med	Low	Med	Med
11.	Establish New MPAs within the Palos Verdes Shelf Region	High	Low	Med	High	Med
12.	Restore Overgrazed Seashore in Abalone Cove	Med	Low	Low	Med	Med
13.	Provide Transportation for Anglers to Areas with "Clean" Fish	Med	Low	Low	Low	Low
14.	Improve Public Amenities and Fishing Access at Marina del Rey, White Point Beach, Pt. Vicente and Pt. Fermin	Low	Med	Low	Low	Low
15.	Giant Sea Bass Hatchery Program	Low	Low	Low	Low	Low

#	Fishing Restoration Project Ideas	Nexus	Feasibility	Benefit	Ecosystem Benefit	Total Score
16.	Restore White Abalone	Low	Med	Low	Low	Low
17.	Restore Algae (Kelp) on the Palos Verdes Coast	Med	Low	Low	Low	Low
18.	Protect and Restore Ormond Beach Wetlands	Low	Med	Low	Med	Low[2]
19.	Clean Up Consolidated Slip	Low	Not rated	Not rated	Not rated	Low
20.	Contribute to Proposed Wilmington Leeward Bay Promenade, Marina & Wetlands Redevelopment	Med	Low	Med	High	Med
21.	White Croaker Commercial Market Certification Program	High	Low	Med	Low	Low

[1] Conceptual approach incorporated into idea # 1 for Tier 2 evaluation
[2] Conceptual approach incorporated into idea # 3 for Tier 2 evaluation

Category: Habitat Manipulation – Artificial Reefs **Number: 1a**

Idea: **Construct Reefs that Enhance Kelp Forests**
Source: Fish Technical Workshop, Ambrose 1994

Summary Description

This is one of four related restoration ideas suggesting variations on a theme of artificial reef development. This idea would aim to construct shallow-water reefs that would promote the establishment and growth of a stable kelp forest. The reef would be designed such that benefits could be derived form the reef even if kelp did not become established. The reefs would be constructed from quarry rock placed on sand bottoms near existing kelp forests.

Rating Criteria

1. Nexus **Rating: High**

This concept has a strong relationship to the injuries of the case. Properly designed and implemented, it would replace existing contaminated soft bottom fish with reef-associated fish that would be less contaminated, and may also increase overall fish productivity.

✓ Location

Suitable locations would be guided by the results of the pending fish contaminant data, sediment contamination data, proximity to existing kelp forests, and EPA remediation plans. Location would be optimized based upon these and other factors such as fishing access, fishing pressure, cost, and regulatory considerations.

2. Feasibility **Rating: Med**

✓ Technical issues

Artificial reefs have a long history for restoration, stock enhancement, and recreational utilization purposes throughout the world. In addition, artificial reefs have been constructed in Southern California for many years so material type, permitting protocol, and estimates of reef productivity exist for most areas. Furthermore, it is highly likely that partnerships could be made with the ports and other groups to share costs and logistics for reef construction.

✓ Operational/Sustainability issues

Reef construction in the area of the San Onofre Power Plant has shown that shallow water reefs provide structure to which kelp has attached naturally; while kelp coverage itself may be dynamic and vary with other factors, a reef system should be stable over the long term and should not require maintenance.

✓ Regulatory issues

Depending on the location and level of potential site-specific concerns by different interests, there might be the need for study and accommodation of the design to various public needs before actual construction.

3. Benefits to Injured Resource or Lost Services **Rating: High**

✓ Duration

While kelp coverage itself may be dynamic and vary with other factors, a reef system should be stable over the long term and provide benefits indefinitely.

✓ Are benefits measurable?

Changes in fish production before and after creation of artificial reefs has been well studied at numerous existing sites. A monitoring system would be integral.

✓ What are the benefits in the absolute sense?

Implementation could serve as both a primary and compensatory restoration mechanism, depending on the size of the reef constructed. Furthermore, this kind of approach would institute ecosystem-level solutions to the injuries of the Montrose case that would enhance and restore natural processes that, once established, would likely be self-sustaining for decades. Reefs could result in the production of less contaminated fish by providing clean substrate for algae and invertebrates. These reefs could be placed near existing or created fishing structures so they could directly contribute to the availability of wholesome fish to anglers.

4. Ecosystem Benefits **Rating: High**

If successful, implementation would provide benefits to a wide variety of kelp forest associated species and would diversify and enhance fish habitat in the Southern California coastal region, which is currently predominated by soft bottom conditions.

Construct Reefs that Enhance Kelp Forests Total Tier 1 Rating: **High**

Category: Habitat Manipulation – Artificial Reefs **Number: 1b**

Idea: **Construct Reefs Around Existing Fishing Piers/Structures**
Source: Fish Technical Workshop, Ambrose 1994

Summary Description

This is one of four related restoration ideas suggesting variations on a theme of artificial reef development. This idea is similar to Idea #1, without the focus on increasing kelp coverage. Instead, it would focus on locating reefs near existing fishing access points. It would entail building artificial reefs in the vicinity of existing piers or other coastal fishing access structures for the purpose of increasing the abundance of contaminant-free fish directly adjacent to those structures. Reefs would not be built directly under the piers, but rather adjacent to the piers and outside of "casting" range for anglers. This approach would allow fishers to catch reef fish that forage off-reef or larger predatory fish that are swimming along the reef fringe. The main part of the reef would be less accessible to anglers and serve more as a production zone rather than a fishing zone.

Rating Criteria

1. Nexus **Rating: High**

This concept has a strong relationship to the injuries of the case. Properly designed and implemented, it would replace existing contaminated soft bottom fish with reef-associated fish that would be less contaminated, and may also increase overall fish productivity.

✓ Location

Exact locations would be determined based upon opportunity and the results of the pending fish contaminants data. Piers with fish consumption advisories for soft-bottom fishes but not for reef-oriented species would be highest priority. Locations would be designed to optimize proximity to areas of contamination while still producing fish with contamination levels below those prompting advisories.

2. Feasibility **Rating: Med**

✓ Technical Issues

Artificial reefs have a long history for restoration, stock enhancement, and recreational utilization purposes throughout the world. In addition, artificial reefs have been constructed in Southern California for many years so material type, permitting protocol, and estimates of reef productivity exist for most areas. Furthermore, it is highly likely that partnerships could be made with the Ports and other groups to share costs and logistics for reef construction. The locations where this concept could be implemented, however, may be relatively limited since it would require an existing fishing structure with an appropriate set of site characteristics. Also, hard-bottom effects on sediment transport and impacts of reef construction on other pier users (e.g., surfers) would need to be considered and evaluated.

✓ Operational/Sustainability Issues

Once constructed, the reef system should be stable and not require ongoing maintenance.

✓ Regulatory Issues

Depending on the location and level of potential site-specific concerns by different interests, there may be a need for study and accommodation of the design to various public needs before actual construction.

3. Benefits to Injured Resource or Lost Services **Rating: High**

✓ Duration

The reef system should be stable over the long term and provide benefits indefinitely.

✓ Are benefits measurable?

Changes in fish production before and after creation of artificial reefs have been well studied at numerous existing sites. A monitoring component would be integral.

✓ What are the benefits in an absolute sense?

Implementation could serve as both a primary and compensatory restoration mechanism, depending on the size of the reef constructed. Furthermore, this kind of approach would institute ecosystem-level solutions to the injuries of the Montrose case that could enhance and restore natural processes that, once established, would likely be self-sustaining for decades. Reefs could result in the production of less contaminated fish by providing clean substrate for algae and invertebrates.

4. Ecosystem Benefits **Rating: High**

If successful, implementation would diversify and enhance fish habitat in the Southern California coastal region, which is currently predominated by soft bottom conditions.

Construct Reefs Around Existing Fishing Piers/Structures

Total Tier 1 Rating: **High**

Category: Habitat Manipulation – Artificial Reefs **Number: 1c**

Idea: **Construct Reefs and Improved Fishing Access to Them**
Source: Fish Technical Workshop

Summary Description

This is one of four related restoration ideas suggesting variations on a theme of artificial reef development. Instead of constructing artificial reefs near existing fishing structures, this idea would involve both building artificial reefs and renovating or constructing new piers or extensions in areas where advisories exist for soft bottom species, but not for hard bottom, reef oriented species. The purpose of these reefs would be to displace contaminated species with wholesome species in areas accessible to boat and shore-mode anglers. As in Idea #2, the concept would not entail building reefs directly under the piers, but rather adjacent to the piers and outside of "casting" range for anglers. This approach would allow fishers to catch reef fish that stray from the reef or larger predatory fish that are swimming along the reef fringe. The main part of the reef would be less accessible to anglers and serve more as a production zone rather than a fishing zone.

Rating Criteria

1. Nexus **Rating: High**

This concept has a strong relationship to the injuries of the case. Properly designed and implemented, it would replace existing contaminated soft bottom fish with reef-associated fish that would be less contaminated, and may also increase overall fish productivity.

✓ Location

Exact locations would be determined based upon opportunity and the results of the pending fish contaminants data. Locations with fish consumption advisories for soft-bottom fishes but not for reef-oriented species would be highest priority. Locations would be designed to optimize proximity to areas of contamination while still producing fish with contamination levels below those prompting advisories. Since the idea calls for creation of new fishing access, it would provide site flexibility in that it wouldn't rely on the presence of existing fishing access structures. Proponents of the idea have suggested Malibu as one possible location for these piers; King Harbor Jetty has also been suggested.

2. Feasibility **Rating: Med**

✓ Technical Issues

Artificial reefs have a long history for restoration, stock enhancement, and recreational utilization purposes throughout the world. In addition, artificial reefs have been constructed in Southern California for many years so material type, permitting protocol, and estimates of reef productivity exist for most areas. Furthermore, it is possible that partnerships could be made with the ports or other groups to share costs and logistics for reef construction. Also, hard-bottom effects on sediment transport and impacts of reef construction on other pier users (e.g., surfers) would need to be considered and evaluated. Construction of fishing access structures (e.g. renovation of piers, etc.) is also a conventional and well understood process.

✓ Operational/Sustainability Issues

Once constructed, a reef system should be stable and not require ongoing maintenance. Maintenance of pier/breakwater structures would be required, but presumably would be the responsibility of other jurisdictions.

✓ Regulatory Issues

The construction of a reef and fishing structure (pier, breakwater, etc.) on the California coast could involve significant regulatory hurdles beyond those involved in the construction of a reef alone. Also, hard-bottom effects on sediment transport and impacts of reef construction on other pier users (e.g., surfers) would need to be considered and evaluated. The feasibility would likely increase if efforts were conducted in partnership with existing waterfront development projects.

3. Benefits to Injured Resource or Lost Services **Rating: High**

As stated above in the nexus factor, implementation could serve as both a primary and compensatory restoration mechanism, depending on the size of the reef constructed. Furthermore, this kind of approach could institute ecosystem-level solutions to the injuries of the Montrose case that could enhance and restore natural processes that, once established, would likely be self-sustaining for decades.

✓ Duration

Reef systems should be stable over the long term and provide benefits indefinitely.

✓ Are benefits measurable?

Changes in fish types and production before and after creation of artificial reefs have been well studied at numerous existing sites. Monitoring would be integral. In particular, levels of contamination in fish could be monitored to determine whether fish available to catch are lower in contamination.

✓ What are the benefits in an absolute sense?

Implementation could serve as both a primary and compensatory restoration mechanism, depending on the size of the reef constructed. Furthermore, this kind of approach could institute ecosystem-level solutions to the injuries of the Montrose case that could enhance and restore natural processes that, once established, would likely be self-sustaining for decades. Reefs could result in the production of less contaminated fish by providing clean substrate for algae and invertebrates. The advantage of building/ renovating piers or other access structures is that it would increase the space available to anglers for fishing, which would directly relate to the compensatory component of the restoration (i.e., bringing fishing opportunity to something that is above baseline).

4. Ecosystem Benefits **Rating: High**

If successful, implementation would diversify and enhance fish habitat in the Southern California coastal region, which is currently predominated by soft bottom conditions.

Construct Reefs and Improved Fishing Access to Them Total Tier 1 Rating: **High**

Category: Habitat Manipulation – Artificial Reefs **Number: 1d**

Idea: **Construct Juvenile Fish Nursery Reefs**
Source: Ambrose 1994

Summary Description

This is one of four related restoration ideas suggesting variations on a theme of artificial reef development. This concept is similar in design to other reef ideas but focuses on creating settlement/nursery habitat for juvenile fishes. The reef design would be similar to other reefs but would specifically include a greater range of depths (i.e., ~40 to ~300 feet) to maximize the range of settlement habitats, as well as the use of durable materials that would be long-lived and enable to the construction of high and low relief areas. The design would also maintain a biological connection between shallow and deep water areas to allow for movements of fishes among depths.

Rating Criteria

1. Nexus **Rating: High**

If successful, implementation would directly contribute to the restoration goal of increasing the availability of less contaminated fish to anglers by increasing the recruitment levels of recreational fish species that are less likely to accumulate contaminants. If this increase in local recruitment occurs, shore-based anglers would only derive a benefit if the reefs were located adjacent to reef habitat that is accessible to shore-based anglers.

✓ Location

Implementation could occur off the Palos Verdes peninsula, in Santa Monica Bay (including the Malibu coastline), and in Orange County, but locations should be considered and be guided by the results of the pending fish contamination data and other factors listed under Ideas #1-3.

2. Feasibility **Rating: Med**

✓ Technical Issues

Design and construction of artificial reefs is technically feasible. California Department of Fish and Game has guidelines and specifications for artificial marine reefs that should be incorporated. This idea would involve building reef habitats in areas that are deeper than what is typical for artificial reefs, which may involve additional logistical or technical difficulties.

✓ Operational/Sustainability Issues

In question is whether these artificial reefs could sustain a long-term fishable resource since they might be easily depleted if, as expected, they are located in areas where surrounding substrate is soft bottom (in which case recruitment/ production of new fish would likely be limited).

✓ Regulatory Issues

Depending on the location and level of potential site-specific concerns by different interests, there may be a need for study and accommodation of the design to various public needs before actual construction.

3. Benefits to Injured Resource or Lost Services **Rating: High**

✓ Duration

The duration would depend on the viability of the reef structures and resource management efforts such as restrictions on the rate at which fish are removed from the reef by anglers. The benefits could be long term. Benefits, such as increasing population sizes for rockfish species in the vicinity of the reef(s), could require a period up to several years (e.g., 3 to 5) before they are realized.

✓ Are benefits measurable?

Changes in fish types and production before and after creation of artificial reefs have been studied at numerous existing sites and monitoring would be integral. The net contribution of these reefs to the local fish populations (i.e., production vs. aggregation) is a debated and unresolved issue. Levels of contamination in fish should be monitored to determine whether fish available to catch are lower in contamination.

✓ What are the benefits in an absolute sense?

The nursery reef might enhance recruitment and survival of rocky reef fish species, including kelp bass and rockfish, which would offset lost fishing opportunities due to fishing advisories and bag limits. Assuming that reef fish are limited by habitat availability or shelter sites (i.e., supply of settlement-stage larvae exceeds settlement habitat opportunity) the reef would increase fish population size. Shallower reefs may support and enhance kelp forests, thereby providing the ecosystem benefits of this diverse community. Deeper reefs would provide less contaminated settlement habitat for species that occur at the same depths as the deeper contaminated sediments. Implementation would likely provide more clear benefits to the injured resource if the "production" reef were coupled with a fishing reef.

4. Ecosystem Benefits **Rating: High**

If successful, implementation could provide benefits to a wide variety of kelp forest species and could provide fishing opportunities to anglers. In addition, if this reef is properly constructed, benefits would be provided both to several species, as well as multiple life stages (i.e., juvenile and adult).

Construct Juvenile Fish Nursery Reefs Total Tier 1 Rating: **High**

Category: Public Awareness **Number: 2**

Idea: **Provide Public Information that Promotes Wholesome Fishing and Fish Consumption**

Source: Fish Technical Workshop

Summary Description

This concept would be developed in collaboration with the current EPA / State of California public outreach campaign known as the Fish Contamination Education Collaborative (FCEC). The MSRP public outreach and education efforts would go beyond simply warning the public about fish species and locations to avoid. They would promote how anglers may improve their fishing experiences by identifying where they may catch fish that are wholesome for consumption, and which species are preferable in this regard. In addition, methods of cleaning and cooking the fish to reduce exposure to contaminants would be evaluated and relayed to the public.

An element of this restoration idea is the likely need for periodic additional fish contamination data gathering.

Rating Criteria

1. Nexus **Rating: High**

This concept relates directly to the injuries of the Montrose Case because it would be designed to shift fishing efforts of local anglers from contaminated to wholesome fish.

✓ Location

This is a public information effort and thus would be implemented over a range of media and methods and over a large geographic area. Certain elements such as kiosks may be placed in areas where they are likely to reach large numbers of affected anglers (e.g. Cabrillo Pier, Redondo Beach Pier).

2. Feasibility **Rating: High**

✓ Technical Issues

Implementation would not present any specific technical challenges, and would rely upon conventional public education/outreach planning and implementation methods. Design would emphasize methods that maximize the amount of public information provided for the dollars spent.

✓ Operational/Sustainability Issues

Such a pubic information effort would require longer term efforts to continue realizing benefits. The concept design could take into consideration the kinds of actions/measures that maximize longer term benefits, e.g. training the trainers, targeting younger audiences, producing materials and messages that are relevant for a long time.

✓ Regulatory Issues

There would not likely be significant regulatory issues.

3. Benefits to Injured Resource or Lost Services **Rating: High**

Implementation would have clear and direct benefits to the injured resource because it would provide a balance between negative (what anglers should not eat) and positive (what to eat instead) information. It would provide local anglers with alternatives to fishing for and consuming contaminated species. This concept would be interlaced with other fish/fishing restoration ideas such that opportunities for wholesome fishing that are generated by these other ideas would be included as alternatives to fishing for contaminated fish.

4. Ecosystem Benefits **Rating: Med**

Implementation would have no benefit to any species or habitat. However, it would have broad benefit to the anglers affected by fishing advisories because it would provide information to a large fraction of the people affected by fish consumption advisories about which fish should be avoided and where what to fish as alternatives. Implementation would also increase the benefits derived from all other fish-related restoration because it would allow an outlet for informing the fishing public about newly generated fishing opportunities.

Provide Public Information that Promotes Wholesome Fishing and Fish Consumption

Total Tier 1 Rating: **High**

Category: Habitat Manipulation - Wetland/embayment **Number: 3**

Idea: **Restore Wetlands (several potential locations)**
Source: (MSRP files) This idea pre-dates the restoration planning phase

Summary Description

This is a broad concept proposing wetlands restoration as a means of improving coastal habitat for fish. It would entail involvement in and providing funding for other on-going multi-party efforts at several sites in Southern California to restore degraded coastal wetlands (given the high costs of such efforts at available sites in Southern California, it is unlikely that MSRP funds alone could entirely support such restoration effort). The outcome would be improvement of degraded coastal wetlands in one or more of several potential locations (Bolsa Chica, Ballona, Famosa Slough, Los Cerritos/Hellman/Los Alamitos, Mission Bay, Santa Ana River mouth, Santa Margarita River mouth).

One design element potentially aligning broader wetlands restoration efforts more closely to the specific objective of fish production would entail development/expansion of eelgrass beds in appropriate portions of the restored areas. There are numerous species of invertebrates and fish that utilize eelgrass communities for foraging, reproduction, and shelter.

Another element which could be combined with this idea is the stocking of portions of the restoration site with juvenile fish, such as California halibut or spotted sand bass.

Rating Criteria

1. Nexus **Rating: Med**

The improvement of coastal wetlands habitats, if properly designed and carried out, might increase production of species of sport fish which utilize these habitats for critical life stages (California halibut, barred sand bass).

✓ Location

All potential sites listed above are within the SCB. Depending on which site(s) were pursued, habitat restoration would be varying distances from locations of lost fishing services.

2. Feasibility **Rating: High**

✓ Technical Issues

There are currently a number of wetland restoration efforts along the coast of the SCB, in different stages of planning and implementation. Wetland restoration science and engineering has ample precedence in actual application, and conventional methods are typically employed for construction/implementation. However, the specific design of the restoration would have a direct impact on its functional benefits for fish and fishing, (i.e. wetlands may be designed to improve different ecological attributes and not all resources benefit equally from the same habitat alterations; e.g. creation of deeper channels and embayments and/or eelgrass would provide greater benefits to fishing than restoration that foregoes such features in favor of bird-advantageous physical features).

✓ Operational/Sustainability Issues

Depending upon the specifics of the measures taken, light to moderate long-term maintenance/operation may be required at wetlands restoration sites. They are generally designed to minimize ongoing operation and maintenance, and designed to be sustaining over a long period.

✓ Regulatory Issues

Commonly, wetlands restorations require thorough environmental reviews and permitting, and various design/construction considerations might be identified that require resolution of competing interests (e.g. needs for adequate flood protection upon restoration of tidal influence). Such issues are typically resolvable.

3. Benefits to Injured Resource or Lost Services **Rating: Med**

✓ Duration

Duration would be long term, presuming actions were designed to be relatively self-sustaining.

✓ Are benefits measurable?

While some commercially or recreationally important species may rely upon coastal wetland habitats for foraging, reproduction, and spawning, it would be difficult to predict, and perhaps harder to evaluate in quantitative terms how much of an increase in production in the populations of sport fishes in the coastal areas of Southern California would result from the proposed restoration activities.

✓ What are the benefits in an absolute sense?

Implementation would likely provide benefits to some species of fish that require wetlands/estuaries as a nursery habitat (e.g., California halibut, barred sand bass). The increase in production might result in increased fishing opportunity for wholesome species of fish (California halibut and perhaps barred sand bass).

4. Ecosystem Benefits **Rating: High**

Implementation might provide benefits to a limited number of species of fish that require shallow protected areas as nurseries (e.g., California halibut, spotted sand bass), but would have broader ecological benefits to numerous natural resources.

Restore Wetlands (several potential locations) Total Tier 1 Rating: **High**

Category: Marine Protected Areas **Number: 4**

Idea: **Augment Funds for Implementing Marine Protected Areas (MPAs) in the Northern Channel Islands**

Source: National Park Service

Summary Description

This restoration concept would entail using MSRP restoration funds to support implementation of the Marine Protected Areas (MPAs) program recently established in several locations around the Northern Channel Islands (NCI). Although management plans have been developed to guide implementation of the MPA program in the NCI, not all aspects of operation (e.g. public awareness, enforcement, and monitoring) are fully funded. Inadequate implementation of management could ultimately skew the evaluation of the relative success/benefits of the MPA program. Thus MSRP restoration funds are seen as a possible means for filling the gap between partial and more complete MPA implementation.

Among other things, MPAs hold the potential to improve fish production within their boundaries, and by extension to enhance fishing opportunities outside of their boundaries as some fish migrate beyond the MPAs. Fish caught around the Northern Channel Islands generally contain lower concentrations of the contaminants of the Montrose case than do fish caught closer to the contaminant sources.

Rating Criteria

1. Nexus **Rating: Med**

✓ Location

On one level, this concept could be interpreted as providing only "out of place" compensatory restoration for the injuries of the Montrose case, in that it would enhance fish habitat and fishing opportunities, but not within the area affected by fish consumption advisories. In addition, anglers who would benefit from the enhanced fishing opportunities around the NCI are not likely to be the same anglers who are being injured by contamination-related fishing advisories and bag limits.

However, fisheries in the coastal areas affected by the contaminants of the case could ultimately benefit from more effective implementation of the NCI MPAs, if they were shown to be beneficial and lead to adoption of additional marine protected areas closer to the current fishing advisory locations. (However, as described in Idea #11, the barriers to development of new MPAs are high at present.)

2. Feasibility **Rating: High**

✓ Technical Issues

MPAs are resource management programs requiring little in the way of physical construction, and as such, there would be few technical feasibility issues.

✓ Operational/Sustainability Issues

MPAs require ongoing commitment of public resources to operate, monitor, and enforce their provisions.

✓ Regulatory Issues

Since the Northern Channel Islands MPAs that are the subject of this concept have already been established, the regulatory/institutional hurdles to their adoption have already been overcome.

3. Benefits to Injured Resource or Lost Services **Rating: Med**

✓ Duration

Enhancement of fish habitats within the MPAs and fishing in areas near the MPAs would be expected to continue as long as the MPAs remained in place and were adequately enforced.

✓ Are benefits measurable?

One could measure changes both within the MPA boundaries in terms of changes in fish production, and outside the boundaries in terms of catch statistics. This in fact would be a primary objective for the use of MSRP funds should this idea be selected for implementation.

✓ What are the benefits in an absolute sense?

Implementation would have a clear benefit to fish and their habitats by providing a safe area that is free from fishing mortality. The benefits to fishing might include increased fishing opportunities on the borders of the MPA as a result of increased production within the MPA. Whether any increased fishing opportunities on the boarders would offset or more than offset the restrictions on fishing within the boundaries is not known at this time.

4. Ecosystem Benefits **Rating: High**

This approach would provide benefits to a wide variety of species. The habitat would not be improved via manipulation but rather via the removal of an important source of mortality – fishing. While establishing an MPA would clearly reduce fishing opportunity within the boundaries of the MPA, it would likely increase fishing opportunity around the perimeter of the protected region. Furthermore, the complete evaluation of the MPA as a management tool might have broader benefits to fish populations along the entire California coast (including areas more directly affected by the contaminants of the case), and perhaps elsewhere.

The California state-wide Marine Life Protection Act (MLPA) program, designed to oversee the standardization of existing and implementation of new MPAs, has recently been stalled due to lack of funding, halting the establishment of any new MPAs and resulting in the near certainty that existing MPAs will not receive increases in support. Contributing to this established program would be free of logistical, technical, or regulatory road blocks, and could result in a more clear and complete evaluation of the MPA concept.

Supporting monitoring, enforcement, and public information efforts would aid the evaluation of the effectiveness of MPAs as a mechanism for increasing fish production. While the existing MPAs are not likely to contribute directly to fishing opportunity in the areas most affected by fish consumption advisories, contributing to the successful monitoring and enforcement of these established MPAs could significantly affect the future of the California MLPA program. If the results of the current program show that local fishing opportunity can be increased outside the limits of the protected areas, then these areas may be expanded and placed along the coast as well. (However, as described under Idea #11, the barriers to development of new MPAs are high at present.) This, in the long term, could result in enhancement of the marine ecosystem within the MPA boundaries and enhancement in fisheries in areas that are affected by fish consumption advisories.

Augment Funds for Implementing Marine Protected Areas (MPAs) in the Northern Channel Islands

Total Tier 1 Score: **High**

Category: Public Access **Number: 5**

Idea: **Operate Fishing Barge(s) over Existing or Constructed Reef(s)**
Source: Fish Technical Workshop

Summary Description

This restoration idea would entail establishing fishing barge(s) similar to those that once existed in many areas in Southern California (Redondo Beach, L.A. Harbor, Long Beach, Seal Beach). These barges functioned to bring high numbers of anglers to productive fishing sites. The barge could either be stationary (requiring a ferry service of some kind to bring anglers to and from the barge) or could operate as both ferry and fishing barge (thus allowing the barge to move to different fishing spots). In the past, these barges operated over soft bottom areas (where white croaker was often the species captured) and over reef sites (the *Isle of Redondo* fishing barge operated in the 1980s over the sunken wreck of a preceding fishing barge, the *Sacramento*, offshore of Redondo Beach). This idea would entail operating a fishing barge/barges over areas producing primarily reef-oriented species that would be lower in contamination. These areas could either be newly created reefs (as suggested above), or existing reefs.

Rating Criteria

1. Nexus **Rating: High**

Public access would be increased to a site/sites that provide opportunities to fish for wholesome fish within the geographic area affected by fish consumption advisories.

✓ Location

The location of the barge/reef would be chosen so that the benefits (i.e., increases in fishing opportunity for people affected by fish consumption advisories) would be optimized; one possible location would be off of Pierpoint Landing in Rainbow Harbor (Long Beach).

2. Feasibility: **Rating: Med**

✓ Technical Issues

Implementation of this idea would involve obtaining an appropriate vessel, modifying and outfitting it for day fishing use, developing a boarding pier or a ferry service, placing mooring structures, etc. None of these actions would present significant issues from a technical standpoint.

✓ Operational/Sustainability Issues

Implementation would have intensive operation and maintenance requirements, as it would assume an ongoing effort to operate the barge(s) and/or ferry anglers to and from the fishing barge, as well as to maintain the barge. Further investigation would be necessary to determine whether a reasonable fee system could be imposed that was self-supporting, and whether there were policy considerations for use of natural resource damages to fund any actions that impose user fees.

✓ Regulatory Issues

Establishing a fishing barge as envisioned could present some regulatory/public acceptance issues, and would require careful planning to address several factors including navigation, protection from wave action, and other user concerns (e.g., objections from windsurfers). There are existing laws regarding fishing barges specifying limits on their size and requiring bulkheading and other public safety measures.

3. Benefits to Injured Resource or Lost Services **Rating: High**

✓ Duration

Duration of benefits from the fishing access barge would be limited to the projected term of operating the system. Assuming that all costs were borne by MSRP restoration funds, it is unlikely that such a system could be operated for many years. However, if developed with MSRP restoration funds and then operated under a self-supporting system of fees, such an operation could last for many years.

✓ Are benefits measurable?

One could monitor and measure the net gain in wholesome fishing opportunities produced.

✓ What are the benefits in an absolute sense?

Implementation could have clear fishing restoration benefits if designed in such a way that it would increase and improves the ability of anglers who might typically be limited to shore-based fishing sites to gain access to safe and productive fishing areas off shore. It could complement/be incorporated into other restoration ideas proposing habitat manipulation to produce more wholesome fish to catch.

4. Ecosystem Benefits **Rating: Low**

This idea evaluated in isolation would only benefit fishing services by providing new access to good fishing sites. If incorporated into other fish restoration ideas, such as creation of an artificial reef, the broader strategy would have benefits to both fish habitat and fishing services.

Operate Fishing Barge(s) over Existing or Constructed Reef(s)

Total Tier 1 Rating: **Med**

Category: Habitat Manipulation - Wetland/embayment **Number: 6a, 6b**

Idea: **Create Protected Shallow-water Habitat.**

a. Extend breakwaters at Los Angeles-Long Beach Harbors to create more protected shallow-water habitat

b. create more shallow-water habitat within existing deep-water areas of Long Beach Harbor or San Diego Bay

Source: Fish Technical Workshop, MSRP files

Summary Description

These suggestions target creation of additional habitat suitable for increased production of California halibut and other species of fish that would be expected to utilize shallow, protected open water marine habitats. The first idea would entail extending portions of the existing breakwaters at Los Angeles and Long Beach Harbors to increase the amount of area protected from open wave action, and converting the adjacent leeward open water areas into a protected, shallow-water habitat that would benefit certain species of fish, such as California halibut. A second, similar idea would not entail extending existing breakwater structures, but would simply call for converting deep open water areas within the existing harbors to shallow habitats.

The concept was put forward during the litigation phase as a potential means of restoring fishing, but specific design details (i.e. locations, areas of habitat change, etc.) were not developed. For evaluation purposes, it is assumed that implementation would entail extending existing breakwater structures in their current configuration to create a greater amount of protected open water habitat, and modifying substrate depths to provide ideal habitat conditions for the targeted fish species.

Rating Criteria

1. Nexus **Rating: Med**

This idea would, in theory, increase fish production for California halibut and potentially other fish species, but it is not clear the extent to which it would result in increased fishing opportunity for safe consumption.

✓ Location

The breakwater extension would be considered for Long Beach and LA Harbors, an area appropriate for addressing the injuries of the case. Shallow open water areas could also be created in San Diego Bay, but these would be further away from the areas where fishing has been most seriously impacted by the contaminants of this case.

2. Feasibility **Rating: Med**

✓ Technical Issues

Extending the breakwater and reducing water depths would be feasible from a strictly technical/ engineering standpoint.

✓ Operational/Sustainability Issues

Ensuring that the sheltered habitat would indeed function as a nursery for commercially and/or recreationally important species that are not affected by consumption advisories would require some form of institutional restriction and monitoring/enforcement.

✓ Regulatory Issues

Extension of these breakwaters might involve significant regulatory hurdles, in terms of environmental review and approval, navigation concerns, and other public interest issues.

3. Benefits to Injured Resource or Lost Services **Rating: Med**

✓ Duration

Once constructed, benefits would likely be long term, although it is unclear whether resource management restrictions would be required to ensure its success.

✓ Are benefits measurable?

Monitoring efforts could be developed that would allow some degree of measurement, although ultimate benefits to anglers would likely be difficult to measure quantitatively.

✓ What are the benefits in an absolute sense?

Although benefits would include the provision of habitat for targeted species, it would be uncertain whether the targeted species would actually recruit to the created habitat. In addition, it is also uncertain whether that habitat would attract uncontaminated fish.

4. Ecosystem Benefits **Rating: Med**

Implementation might provide benefits to more than one species that require shallow protected areas as nurseries. Benefits to anglers that are affected by fish consumption advisories are not clear.

Create Protected Shallow-water Habitat

Total Tier 1 Rating: **Med**

a. Extend breakwaters at Los Angeles-Long Beach Harbors to create more protected shallow-water habitat
b. Create more shallow-water habitat within existing deep-water areas of Long Beach Harbor or San Diego Bay

Category: Stock Enhancement - Put & Take **Number: 7**

Idea: **Supplement Near-shore Fisheries in Contaminated Areas with Clean, Hatchery-raised Fish**

Source: Hubbs-Sea World Research Institute

Summary Description

The primary goal of this submission from Hubbs-Sea World Research Institute would be to use hatchery releases of native fishes to directly restore fishing opportunities to recreational, commercial and subsistence fishermen in the area most directly impacted by the Montrose case contaminants. Hatchery fish could be released at or near legal size limits when size limits apply. This approach would assure fishermen that their catches are not tainted by continued food-web contamination in the area. By marking the fish prior to release, fishermen would know precisely what the health risks posed by their catches were. A secondary goal of this idea would be to involve fishermen in the culture process, thereby vesting them in the effort and facilitating the dissemination of information regarding the status of affected resources.

The primary species of focus would be California halibut (Idea #10a). In the first two years, other species would also be evaluated for suitability to the goals of implementation. These species would include but not be limited to kelp bass (Idea #10b), California sheephead (Idea #10c), and white croaker (Idea #10d).

Rating Criteria

1. Nexus **Rating: High**

This idea has a clear nexus to the case since the goal would be to replace lost fishing opportunities as a result of consumption advisories with alternative opportunities to catch fish that were contaminant-free. Implementation would involve releasing cultured fish directly into coastal waters most impacted by the Montrose contaminants and where anglers fish. Assessment work (tracking and field sampling) would also occur in this area. Production of juveniles for release would occur at one of several potential hatchery locations. Broodstock would be maintained by HSWRI laboratories in Carlsbad and San Diego.

✓ Location

Implementation would focus on providing less contaminated fish for fishing in the immediate area of high contamination impacts.

2. Feasibility **Rating: Med**

✓ Technical Issues

Rearing California halibut to release size would clearly be feasible. Rearing other species to a release size close to legal size limits would be similarly feasible. However, according to the proponents, it would take approximately 3 years from the start of the effort before first release could be made. Further, the feasibility/potential of using hatchery releases of fish into an open system such as the Southern California Bight to significantly increase fishing opportunity is an open question, particularly for species whose populations are currently abundant.

✓ Operational/Sustainability Issues

Implementation would not be self-sustaining, but would only provide benefits for as long as it were actively operated.

✓ Regulatory Issues

Regulatory approvals would be necessary, but with appropriate design and monitoring, could likely be obtained.

3. Benefits to Injured Resource or Lost Services **Rating: Med**

✓ Duration

Benefits to natural resources would be realized as soon as uncontaminated fish were added to the ecosystem. This would happen 2-3 years from the start of the effort, depending on the growth rate of each species cultured and the associated time it would take for them to reach legal size. The duration of benefits would depend on how the supplementation (estimated cost of $275,000 per year) would be managed into the future. A major drawback of this approach is that the benefits could only be derived for as long as the effort was fully supported.

✓ Are benefits measurable?

As designed, it should be feasible to monitor the numbers of such fish that were actually caught by local anglers.

✓ What are the benefits in an absolute sense?

Implementation would provide direct, significant benefits to the natural resources and fishing services by supplementing local fish stocks, many of which are contaminated to unsafe levels for consumption, with cultured fish that were known to be low in contaminants. The natural resources would benefit by having an infusion of "cleaner" fish added to the natural food web. The public would receive the greatest benefit by having access to identifiably "cleaner" fish to catch and eat.

4. Ecosystem Benefits **Rating: Low**

Implementation would only benefit whichever species were selected for stocking, and anglers who caught that species of fish.

Supplement Near-shore Fisheries in Contaminated Areas with Clean, Hatchery-raised Fish

Total Tier 1 Rating: **Med**

Category: Stock Enhancement - Stock Recovery **Number: 8**

Idea: **Spotted Sand Bass Hatchery Program**
Source: Fish Technical Workshop, California State University, Northridge

Summary Description

The proponents of this idea propose to develop hatchery techniques that could ultimately be used to supplement spotted sand bass populations that have been depleted in Southern California due to habitat loss and overfishing. The proponents suggest that spotted sand bass is particularly likely to respond to stock enhancement efforts because it is a species whose life history is largely contained within the boundaries of wetland/estuarine areas, so released fish are likely to remain in the region of their release.

As proposed, implementation would aid in stock recovery, rather than operate a put-and-take effort.

Rating Criteria

2. Nexus **Rating: Med**

Spotted sand bass are not currently subject to any fish consumption advisories. This species, however, is a popular sport fish and one that is currently at population levels that can not sustain fishing mortality. A successful restoration of this species would provide a new, shore-based alternative to fishing on Pier structures for fish that are not listed under any fish consumption advisories.

✓ Location

Implementation would involve placing juvenile hatchery-reared fish within embayments along the Southern California coast that have existing suitable habitat. Specific sites have yet to be selected, but preference would be given to suitable sites that would most likely draw anglers who currently fish in areas with the highest marine fish contamination.

2. Feasibility **Rating: Med**

✓ Technical Issues

The proponents have clearly demonstrated that they are capable of maintaining spotted sand bass brood stock, getting them to spawn in captivity, and rear the young. In addition, spotted sand bass are fast growing, and would likely reach a releasable size in a year or less.

However, since spotted sand bass are currently heavily depleted by the current level of fishing effort and limited available habitat, implementation of this idea would likely not increase fishing opportunities over the longer term, unless coupled with creation of additional habitat capable of sustaining a larger population.

✓ Operational/Sustainability Issues

Such an effort would be self-sustaining only if measures were undertaken as described above to either reduce fishing pressure or increase suitable habitat.

✓ Regulatory Issues

Regulatory approvals would be necessary, but with appropriate design and monitoring, could be obtained.

3. Benefits to Injured Resource or Lost Services

Rating: Low

✓ Duration

If stock enhancement were coupled with a wetland restoration that increased habitat quantity/quality and thus supported a larger population, the benefits would be sustained well beyond the time-scale of implementation. But as proposed, benefits would be short lived, since fishing restrictions would likely be needed to maintain the recovered populations.

✓ Are benefits measurable?

As designed, it should be feasible to monitor changes in spotted sand bass populations.

✓ What are the benefits in an absolute sense?

Such an effort would lead to a better understanding of the early life history of spotted sand bass, particularly if the proponents were to use the resulting larvae as part of a larger effort that investigated influences of environment on growth and mortality. This kind of information would be essential for gaining a clearer understanding of the highly variable recruitment process that appears to add to the vulnerability of this species to fishing pressure. However, the benefits to the injured parties in the Montrose case (i.e., anglers affected by fish consumption advisories) would likely be minimal unless, as stated above, it were implemented in conjunction with habitat restoration, so as to provide for a larger sustainable population.

4. Ecosystem Benefits

Rating: Low

Implementation would only affect one species and would be narrowly focused on developing techniques that could ultimately be used to benefit only one service by one species in a way that would likely be unsustainable.

Spotted Sand Bass Hatchery Program

Total Tier 1 Rating: **Med**

Category: Habitat Manipulation - Kelp/algae **Number: 9**

Idea: **Restore Depleted Kelp Beds of Malibu and Palos Verdes**
Source: Santa Monica Baykeeper

Summary Description

Implementation of this restoration idea would entail expanding the current kelp restoration activities of the Santa Monica Baykeeper from Santa Monica Bay to include Palos Verdes and Malibu. The proponents of this idea suggest that this current project is large and currently has multi-agency support, and would therefore incur substantially less start-up and implementation costs than other efforts of similar scale and approach. The proponents suggest using kelp forest restoration techniques that have been perfected over the past 30-40 years, including grazer removal, transplanting, outplanting, and the use of sporophyll bags for reestablishing kelp.

Rating Criteria

1. Nexus **Rating: High**

The establishment of more extensive kelp beds on the PV shelf could potentially increase habitat for and production of water column feeding fishes, which are less likely to feed from benthic communities and may therefore be less likely to accumulate contaminants.

✓ Location

This effort would specifically restore kelp forests to the PV shelf area, but would be part of a larger, established project that spans much of Santa Monica Bay. Funding would be requested only for the increased costs that the current project would incur for expanding the restoration to the PV shelf and Malibu. Proximity of the PV Shelf site to areas of highest contamination may result in fish that still accumulate unacceptably high levels of contamination; care would be needed to avoid this outcome.

2. Feasibility **Rating: Med**

✓ Technical issues:

The proponents use techniques that have been implemented and shown to be successful from a technical standpoint in Santa Monica Bay, i.e. outplanted kelp has become established and grown. However, kelp forests have been shown to be increasing throughout the Southern California Bight in recent years, even where such intervention is not taking place.

✓ Operational/Sustainability issues:

Studies indicate that these algal communities are highly dynamic in nature and short-term reestablishment efforts may have little effect on the long-term sustainability of the community. Thus, if the objective were to maintain a certain amount of kelp forest coverage, ongoing monitoring and periodic repeat out-planting might be required.

✓ Regulatory issues:

The existing program has already gained support from wide range of agencies (Army Corps of Engineers, California State lands Commission, California Coastal Conservancy, California Department of Fish and Game, Los Angeles county Regional Water Quality Control Board, NOAA, and the Santa Monica Bay Restoration Commission).

3. Benefits to Injured Resource or Lost Services **Rating: Low**

✓ Duration

Studies indicate that these algal communities are highly dynamic in nature and short-term reestablishment efforts may have little effect on the long-term sustainability of the community, and thus the benefits to fishing.

✓ Are benefits measurable?

Monitoring changes in kelp coverage and fish species and densities would not present any unusual challenges.

✓ What are the benefits in an absolute sense?

The proponents claim that the short-term investments of their program to establish kelp forests have an expected permanence that could be measured in decades. Kelp beds are a natural but highly dynamic component of the marine ecosystem. Current kelp monitoring studies suggest that kelp abundance is increasing naturally throughout the Southern California Bight and thus the true contribution and sustainability of current out-planting efforts are difficult to interpret. As a result, the degree to which out-planting of kelp in the absence of other habitat changes (e.g. creation of new hard-bottom substrate) would lead to a sustained benefit to the fish resources is uncertain.

4. Ecosystem Benefits **Rating: Low**

Since kelp forests act as important habitat for a wide variety of marine species, increasing the coverage of such communities could have broad benefits; however, it is not clear that the action of outplanting kelp alone would lead to a sustained increase in this kind of habitat.

Restore Depleted Kelp Beds of Malibu and Palos Verdes Total Tier 1 Rating: **Med**

Category: Habitat Manipulation – Artificial Reefs **Number: 10**

Idea: **Convert Decommissioned Oil Platforms to Artificial Reefs**
Source: Science Applications International Corporation

Summary Description

Implementation of this idea would entail combining planned oil platform removal with construction of artificial reefs as a way to provide habitat and improve the productivity of coastal fish species that support recreational and subsistence fisheries. This "Rigs to reefs" concept could be a collaborative effort with Minerals Management Service, California State Lands Commission, and commercial oil companies directly or through Western States Petroleum Association. Platform removal provides materials (e.g., platform legs and cement footings) potentially suitable for construction of artificial reefs that would otherwise represent a potentially costly upland disposal problem. Platform operators are also required to remove the residual shell mounds. If left in place, these mounds represent a potential obstacle to commercial fishing and therefore a possible dredging and disposal issue. However, these mounds also offer potential bathymetric features (favored by some recreational fishermen) that, if properly designed, could serve as artificial reefs.

Rating Criteria

1. Nexus **Rating: Med**

Creation of artificial reefs using platform structures is intended to provide habitat and improve productivity of marine fishes. In particular, reef structures would be expected to benefit rockfishes, which have been heavily depleted off California by commercial fishing. Depending on the minimum depth of the constructed reefs, other fish species including kelp bass could benefit. These species are often targeted by recreational fishermen.

Given that oil companies stand to save significant amounts of money if the decommissioned platforms are converted to reefs rather than completely removed as is currently required by their permits, it is unclear that MSRP funds would be needed for such an effort.

✓ Location

Implementation would focus on platforms in State and Federal waters within the Southern California Bight, off Orange County and in the Santa Barbara Channel, generally not in proximity to areas of higher DDT/PCB sediment contamination.

2. Feasibility **Rating: Med**

✓ Technical Issues

The design and construction of artificial reefs would be technically feasible. California Department of Fish and Game has guidelines and specifications for artificial marine reefs that should be incorporated.

✓ Operational/Sustainability Issues

In question is whether these artificial reefs could sustain a long-term fishable resource, since they may be easily depleted if, as expected, they were in locations where surrounding substrate is soft bottom (in which case recruitment/production of new fish would likely be limited).

✓ Regulatory Issues

Significant controversy exists over the legitimacy of using oil platforms as fishing reefs because of the requirement that oil companies remove all evidence of platforms once they are decommissioned. Furthermore, the shell mounds at the base of the oil platforms have been shown to be highly contaminated; the proponent indicates that studies are currently underway in that regard.

3. Benefits to Injured Resource or Lost Services **Rating: Low**

✓ Duration

Once constructed, reef system should be stable over the long term. The duration of fishing benefits would depend on the viability of the reef structures, as well as resource management efforts such as restrictions on the rate at which fish are removed from the reef by anglers. The benefits might be long term. Benefits, such as increasing population sizes for rockfish species in the vicinity of the reef(s), might require a period up to several years (e.g., 3 to 5) before they were realized.

✓ Are benefits measurable?

Changes in fish types and production before and after creation of artificial reefs have been well studied at numerous existing sites and such monitoring would be integral. The net contribution of these reefs to the local fish populations (i.e., production vs. aggregation) is a debated and unresolved issue. In particular, levels of contamination in fish could be monitored to determine whether fish available to catch are lower in contamination.

✓ What are the benefits in an absolute sense?

Since the oil platform structures already exist and provide hard substrate supporting a diversified biological community, the net effects of this effort would perhaps not be as great as if reefs were created in areas where no hard substrate currently exists. Notwithstanding, such an effort should enhance biological resources. However, these structures would provide fishing benefits only to offshore boat anglers, not to shore or near-shore anglers who are most affected by fish consumption advisories.

Some questions and controversy remain involving the potential for chemical contaminants in shell mounds. SAIC is currently conducting studies for California State Lands Commission of contaminant leaching at the 4H shell mounds that will generate data relevant to this criterion. The primary species that would use these reefs would likely be those for which contaminant-related fish consumption advisories do not apply (i.e., offshore rockfishes). Furthermore, the level of contamination that exists in oil-rig-associated fishes due to contaminated shell mounds at the base of the structures has not been evaluated.

4. Ecosystem Benefits **Rating: Med**

Implementation of this idea could provide benefits to a wide variety of fish species, and could also provide fishing opportunities to certain anglers with the means to reach them. However, shore-based anglers would not benefit from such efforts.

Convert Decommissioned Oil Platforms to Artificial Reefs Total Tier 1 Rating: **Med**

Category: Marine Protected Areas **Number: 11**

Idea: **Establish New MPAs within the Palos Verdes Shelf Region**
Source: MSRP files

Summary Description

This idea entails establishing Marine Protected Areas (MPAs) in selected areas within the PV shelf region to both aid recovery of the marine environment within the protected area, as well as enhance fishing opportunities in adjacent areas. MPAs would be established as part of the creation of an artificial reef based restoration effort. The reef area would be structured to include protected areas that would serve as "production" areas, and fishing areas that would be available to shore-based and land-based anglers.

Rating Criteria

1. Nexus **Rating: High**

If structured correctly, the possible increase in production within the protected area(s) could improve the ability of a reef-based restoration project to provide increases in sustainable fishing opportunity.

✓ Location

An MPA/multiple MPAs would be sited in optimal locations with respect to addressing injuries of the case.

2. Feasibility **Rating: Low**

✓ Technical Issues

This would be primarily a regulatory action rather than a physical action, thus it would not present any technical issues per se.

✓ Operational/Sustainability Issues

Success of this effort would depend heavily upon its implementation and enforcement, in particular, dissemination of public information, adequate enforcement of restrictions, and public outreach about related benefits.

✓ Regulatory Issues

Establishment of MPAs would require a lengthy and costly public process, and generally generates significant public controversy. The California state wide Marine Life Protection Act (MLPA) program, which is designed to standardize existing and implement new MPAs has currently been stalled due to lack of funding, so establishing a new MPA would be difficult in the near term. While the MLPA board would consider a proposal from MSRP to implement a new MPA or extend an existing MPA, the proposal would have to have broad and unanimous support from the public and the costs of monitoring and enforcement would need to be identified.

3. Benefits to Injured Resource or Lost Services **Rating: Med**

✓ Duration

This would depend entirely upon the duration of active implementation of the state-wide MLPA program, which may be subject to future changes.

✓ Are benefits measurable?

Long term monitoring could identify community changes over time. Benefits to fishing might be difficult to measure, but could be estimated by examining fish abundances between similar-sized reefs that include and do not include protected areas.

✓ What are the benefits in the absolute sense?

Establishing an MPA would have a clear benefit to "fish and their habitats" by providing a safe area that is free from fishing mortality. It could also provide increases in opportunity to fish for wholesome fish by increasing the overall level of fishing that a reef may sustain. The magnitude of this benefit would be difficult to predict until the results from the northern Channel Islands MPAs, which were established for the purpose of evaluating the contribution of MPAs to the abundance of local fish populations, provide an estimate of the utility of this approach to fish management.

4. Ecosystem Benefits **Rating: High**

This approach would provide benefits to a wide variety of species. The habitat would not be improved via manipulation, but rather via the removal of an important source of mortality – fishing. While establishing an MPA would clearly reduce fishing opportunity within the boundaries of the MPA, they would likely increase fishing opportunity around the perimeter of the protected region. Furthermore, the complete evaluation of the MPA as a management tool may have broader benefits to fish populations along the entire California coast and perhaps elsewhere.

Establish New MPAs within the Palos Verdes Shelf Region

Total Tier 1 Score: **Med**

Category: Habitat Manipulation - Kelp/algae **Number: 12**

Idea: **Restore Overgrazed Seashore in Abalone Cove**
Source: Earth Alert

Summary Description

This idea is one of two submitted by the same proponent, each with the similar goal of increasing the presence of kelp communities. The objective would be to restore native species of algae to Abalone Cove on the PV peninsula, where overgrazing by urchins and invasion by exotic algae has displaced native fauna. This specific idea would entail removing both urchins and exotic algae and out-planting algae cultured from propagules obtained from adults from the Monterey Peninsula.

Rating Criteria

1. Nexus **Rating: Med**

These efforts would aim to increase production at the primary level of organic material that is the foundation of the coastal shelf food web. Algae derives little or no energy from the sediments so it is possible that this increase in primary production would be relatively contaminant free, which could result in a decrease in bioaccumulation rates in the PV shelf food web. The indirect relationships between these specific ideas and the specific fishing injuries of the Montrose case, however, are untested and speculative.

✓ Location

The proponent proposes targeting a near-shore area of the PV peninsula, Abalone Cove, but does not specify the size of the area over which algae restoration would occur. This is in such close proximity to the areas of highest contamination that fish inhabiting kelp communities in these areas may still harbor unacceptably high levels of contamination from a human consumption standpoint.

2. Feasibility **Rating: Low**

✓ Technical issues:

The culturing and outplanting methodologies suggested raise technical practicability issues. Removal of exotic species would be somewhat more practicable from a technical standpoint, but would require specific methodological development and evaluation.

✓ Operational/Sustainability issues:

It is likely that these algal communities are highly dynamic in nature and that factors affecting their distribution are not completely understood. Thus, short-term reestablishment efforts might not lead to the long-term sustainability of the community, and thus to benefits to fishing, without periodic re-establishment efforts

✓ Regulatory issues:

Obtaining permits to transplant aquatic plants that are native to the Monterey Bay area to the PV area might be extremely difficult or impossible.

3. Benefits to Injured Resource or Lost Services **Rating: Low**

✓ Duration:

It is likely that these algal communities are highly dynamic in nature and short-term reestablishment efforts might have little effect on the long-term sustainability of the community. Removal of exotic species would likely have more sustainable effects for the Abalone Cove idea.

✓ Are benefits measurable?

Long term monitoring could identify community changes over time. However, due to the dynamic nature of kelp communities and the many factors that influence their abundance and distribution, it is not clear that changes could be definitively attributed to intervention such as this. Benefits to fishing would also be difficult to measure.

✓ What are the benefits in the absolute sense?

Implementation of this concept would address the injuries of the Montrose case from an ecosystem perspective. In principal, the restoration of natural ecosystem processes is more likely to be self-sustaining and have longer-term benefits that extend beyond the time-frame of the effort than are efforts that do not work to restore ecosystem processes. However, the degree to which changes might be attributed to this intervention and the timeframe over which increased abundance would occur is uncertain. The specific benefits to lost fishing opportunities (i.e., whether this effort would lead to higher abundances of less contaminated fish) would also be uncertain due to proximity to areas of high contamination.

4. Ecosystem Benefits **Rating: Med**

If successful, implementation would have impacts on multiple species; however, the period over which they would occur is uncertain, and the degree to which fishing resources would benefit is uncertain. Regardless of the long term success of the algae outplanting, the removal of exotic species could provide more sustainable benefits to the ecology of that area.

Restore Overgrazed Seashore in Abalone Cove Total Tier 1 Rating: **Med**

Category: Public Access **Number: 13**

Idea: **Provide Transportation for Anglers to Areas with "Clean" Fish**
Source: Fish Technical Workshop

Summary Description

This restoration idea would entail providing a public transportation means for anglers who normally fish in areas that are affected by fish consumption advisories (e.g., Cabrillo Pier, White Point) to fishing areas where there are no fish consumption advisories (e.g., Ventura).

Rating Criteria

3. Nexus **Rating: Med**

The free transportation to alternative fishing sites, if utilized by the affected anglers, would in theory improve their ability to fish for less contaminated fish. Such an option would not improve fish or their habitats, and might increase fishing pressure at selected fishing destination sites.

✓ Location

Transportation would presumably originate from certain popular fishing sites with advisories, such as Cabrillo Pier, and end at sites beyond the advisory areas.

2. Feasibility **Rating: Low**

✓ Technical Issues

It would be feasible to set up and implement such an effort from a purely technical standpoint, although its ultimate success in attracting large numbers of anglers would be subject to many other human use and preference factors.

✓ Operational/Sustainability Issues

Implementation would require large amounts of capital, and would only last as long as funds were available to support it. Furthermore, the idea raises several issues, including who would operate such a system and liability concerns should an accident occur while anglers are being transported.

✓ Regulatory Issues

Creating and operating a system for transporting anglers would likely encounter public resistance (both from the standpoint of current users/residents near the planned destination fishing sites, and in terms of acceptance by the anglers to be transported themselves). There would also likely be substantial logistical hurdles.

4. Benefits to Injured Resource or Lost Services **Rating: Low**

✓ Duration

Unless substantial financial commitments to a longer-term operation were made, duration would be short-term.

✓ Are benefits measurable?

It would be possible to count the number of anglers participating.

✓ What are the benefits in an absolute sense?

People fish on piers largely because it is cheap, convenient, and fun. All of these assets to pier fishing might be significantly undermined if pier fishing were altered so that the anglers wait for and ride public transportation to and from sites in Southern California. Secondly, the sustainability of the increases in crowds and fishing activity at the destination fishing areas would have to be seriously considered.

This effort would provide shore-based anglers at affected sites an alternative to fishing from the local piers where there are consumption advisories for several species of fish. This alternative, while clearly one that would result in the angler catching more wholesome fish, would also require significantly more time, logistical, and financial consideration on the part of the angler. This would likely mean that few subsistence anglers would take advantage of the transportation opportunity and would continue to fish from local piers for contaminated fish.

4. Ecosystem Benefits **Rating: Low**

Implementation of this idea would have no benefit to fish or fish habitat and would only benefit those anglers that were willing to ride a bus for an hour or more each way to go fishing instead of fishing locally on the piers.

Provide Transportation for Anglers to Areas with "Clean" Fish

Total Tier 1 Rating: **Low**

Category: Public Access **Number: 14**

Idea: **Improve Public Amenities and Fishing Access at Marina del Rey, White Point Beach, Pt. Vicente and Pt. Fermin**

Source: LA County Dept. of Beaches and Harbors

Summary Description

This restoration idea incorporates four sub-ideas, each directed towards enhancing access and accommodations for people using the four areas listed in the title. Improvements would include ferry boats, dock facilities, signage, pedestrian amenities, improvements to lifeguard and public restrooms, construction of new public fishing piers, parking lots, picnic areas storm water mitigation, landscaping, and lighting.

Rating Criteria

1. Nexus **Rating: Low**

This idea suggests compensating for lost fishing opportunities caused by the contamination of the case by improving physical amenities for use by the public at large, including anglers, at these four sites; however, it would do so without reducing exposure to contaminated fish in three of the four locations proposed. (While the fourth location is an area not covered by the current fish advisories, there is no indication that anglers would move to this location from areas with more contaminated fish.) Thus the idea doesn't directly address the injuries of the case. Also, in the absence of actions to decrease contamination in fish commonly caught at these sites, if the improvements encouraged more angling, they might increase public exposures to contaminated fish (not among anglers who are "catch and release" anglers, but among those who are likely to consume their catch or give it to family members). Implementation of this idea would not involve improvements to fish and their habitats.

✓ Location

The White Point, Point Vicente, and Pt. Fermin sites are on the Palos Verdes peninsula itself, where the highest levels of sediment contamination occur. Marina del Rey is in Santa Monica Bay and the immediate site is not currently included in state fish consumption advisories.

2. Feasibility **Rating: Med**

✓ Technical Issues

The ideas suggested do not appear to present any particular technical challenges.

✓ Operational/Sustainability Issues

The nature of improvements, and the specific amenities such as restrooms, parking lots, ferries, etc. would require intensive operation and maintenance.

✓ Regulatory Issues

Many of the suggested physical improvements would require normal environmental reviews and permitting consistent with urban redevelopment type efforts.

3. Benefits to Injured Resource or Lost Services **Rating: Low**

✓ Duration

Once constructed, aesthetic and access benefits would be longer term, provided improvements were maintained by the proponents.

✓ Are benefits measurable?

It would be possible to measure changes in public use of facilities over time.

✓ What are the benefits in an absolute sense?

The benefits of these physical improvements, as they relate to the case, would be that people fishing in these improved areas would potentially derive more enjoyment and comfort during their fishing activities. However, the improvements would do nothing to change the species composition of the fish collected by the anglers, and it might increase the level of fishing that occurs. Given that, with the exception of Marina del Rey, several species of fish caught at the sites suggested are contaminated to levels requiring consumption advisories, the improvements could result in increased exposure of the public to contaminated fish.

4. Ecosystem Benefits **Rating: Low**

Implementation of this idea would provide no benefit to fish or fish habitat and would only provide an increase in the potential for fishing enjoyment.

Improve Public Amenities and Fishing Access at Marina del Rey, White Point Beach, Pt. Vicente, and Pt. Fermin

Total Tier 1 Rating: **Low**

Category: Stock Enhancement - Stock recovery **Number: 15**

Idea: **Giant Sea Bass Hatchery Program**
Source: Fish Technical Workshop, MSRP files

Summary Description

This idea aims to help restore one of Southern California's most sought after sport fish. Salt water hatchery and grow-out technology now used to help restore white sea bass stocks in Southern California would be applied to giant sea bass (a.k.a. black sea bass). The resulting juveniles would be released off the Palos Verdes Peninsula and elsewhere in Southern California.

Rating Criteria

1. Nexus **Rating: Low**

Black sea bass are not currently and have never been a species for which consumption advisories have been issued. Furthermore, because of its depleted numbers, there is currently a zero-take limitation for black sea bass in the entire Southern California region. Thus, releasing juveniles would only result in an increase in fishing opportunity if and when black sea bass stocks had recovered sufficiently to remove these restrictions. Finally, black sea bass were fished to near extinction once, and are particularly vulnerable to overfishing because of their life history (long-lived, old age at first reproduction, highly variable recruitment, etc), so any sport fishery that may open in the future is likely to be severely limited to avoid a second population collapse.

✓ Location

Efforts would presumably be targeted to increase numbers of these fish throughout the SCB.

2. Feasibility **Rating: Low**

✓ Technical Issues

Rearing black sea bass beyond the early larval stages has yet to be achieved. The survival potential of released juvenile black sea bass has not been evaluated.

✓ Operational/Sustainability Issues

Such an effort would not be self-sustaining, but would only provide benefits for as long as it is actively operated.

✓ Regulatory Issues

Regulatory approvals would be necessary, but with appropriate design and monitoring, could be obtained.

3. Benefits to Injured Resource or Lost Services **Rating: Low**

✓ Duration

Either ongoing hatchery operation or harvesting limitations would likely be necessary to sustain the benefits of such an effort over the longer term. Indeed, by the time adequate methods were developed to rear black sea bass to appropriate sizes and numbers to initiate a release effort (which could potentially take many years to complete), the species might be well on their way to a full recovery.

✓ Are benefits measurable?

There is reasonable evidence that black sea bass are recovering naturally and it could be difficult/ impossible to evaluate the degree to which releases of cultured juveniles would contribute to the natural recovery.

✓ What are the benefits in an absolute sense?

The proponents of this idea suggest that it would provide direct, significant benefit to the natural resources and the public by recovering local stocks of a highly prized sport fish. There is, however, currently no data to suggest that these black sea bass would not be contaminated themselves. Given that these fish are 1) long-lived, and 2) are known to forage upon white croaker, it is possible, if not likely, that they would act as a major contaminant concentrator.

Benefits to natural resources would not realized for several years because the methods by which black sea bass are reared from the larval to juvenile stage have yet to be developed. Furthermore, as stated in the feasibility section, implementation would not result in any increase in fishing opportunity until the population has recovered enough to allow for lifting the fishing ban that is currently in place. It is important also to stress the point that the current fishing ban for black sea bass is not due to contamination levels or consumption advisories, but to a population collapse that occurred largely because of overfishing.

4. Ecosystem Benefits **Rating: Low**

This effort would only benefit a single species.

Giant Sea Bass Hatchery Program

Total Tier 1 Rating: **Low**

Category: Stock Enhancement - Stock Recovery **Number: 16**

Idea: **Restore White Abalone**
Source: Channel Islands Marine Resource Institute

Summary Description

CIMRI has been involved in efforts to study and restore white abalone since the late 1990s. Working with the California Department of Fish and Game, the National Park Service, the National Marine Fishery Service, the U.S. Fish and Wildlife Service, Scripps and UC Santa Barbara, they have helped to institute a program to study and restore the white abalone to its former habit. They have held wild white abalone since 2000 and began raising their offspring since May 2001. Their goal is to outplant hatchery-raised abalone to areas in Southern California from which they have been extirpated.

This restoration idea would entail the establishment of white abalone colonies in the ocean using hatchery-raised adult abalone. These animals would be capable of spawning immediately upon release. At this time CIMRI's first "crop" of hatchery raised animals is almost two years old. Depending upon the outplanting design, up to another 2-3 years of hatchery growth would be required prior to release of these animals. Once outplanted, animals would be monitored for survival and recruitment of subsequent generations. Benefits, in the form of self-reproducing populations should be detectable within 5-10 years.

Rating Criteria

1. Nexus **Rating: Low**

While this idea would address marine resources, it would not involve any of the injured resources of the Montrose case. If white abalone were recovered to the point where they could be removed from endangered status, and were abundant enough to re-open a fishery for them, this effort could represent a contribution of an alternate fishing opportunity that could replace opportunities lost due to fish consumption advisories. However, the anglers that are limited by the advisories are extremely unlikely to be able to take advantage of this alternate resource.

✓ Location

White abalone would be outplanted within the Southern California Bight, but not in areas most affected by the contaminants of the case.

2. Feasibility **Rating: Med**

✓ Technical Issues

The protocols by which abalone are reared have been developed and perfected by CIMR staff. It would clearly be possible to place these reared individuals in nature, but it is not clear what the probability is that these individuals would successfully reproduce.

✓ Operational/Sustainability Issues

Once the abalone population recovered, provided it wasn't over-harvested, sustaining it would not be expected to require longer term human intervention.

✓ Regulatory Issues

Because this species is listed under the Endangered Species Act, significant regulatory hurdles would hamper the process of collecting broodstock and placing reared individuals in nature.

3. Benefits to Injured Resource or Lost Services **Rating: Low**

✓ Duration

It is expected that it would take a significant number of years before populations recovered to levels that might allow for limited harvesting. Resource management would likely be required to provide for longer term sustaining of populations.

✓ Are benefits measurable?

Results could be monitored and measured through conventional methods.

✓ What are the benefits in an absolute sense?

Implementation would have no direct benefit to any of the fishing-related injuries in the case until the population had recovered sufficiently to re-open a recreational fishery for white abalone. At that point, the benefits to the injured resources (i.e., fishing opportunity lost due to fish consumption advisories) would be minimal.

4. Ecosystem Benefits **Rating: Low**

Implementation would primarily benefit a single species, white abalone, although restoration of this animal would restore a lost element of ecosystem diversity.

Restore White Abalone Total Tier 1 Rating: **Low**

Category: Habitat Manipulation - Kelp/algae **Number: 17**

Idea: **Restore Algae (Kelp) on Palos Verdes Coast**
Source: Earth Alert

Summary Description

This is one of two ideas suggested by the same proponent, each with the similar goal of increasing the presence of kelp communities. This idea would entail culturing and out-planting algal species in coastal areas along the PV peninsula. The proponents suggest placement of some 50 species of algae to the PV shoreline over an approximately 50 week period. Proponents suggest out-planting of algae cultured from propagules obtained from adults from the Monterey Peninsula.

Rating Criteria

1. Nexus **Rating: Med**

Implementation of these ideas would aim to increase production at the primary level of organic material that is the foundation of the coastal shelf food web. Algae derives little or no energy from the sediments so it is possible that this increase in primary production would be relatively contaminant free, which could result in a decrease in bioaccumulation rates in the PV shelf food web. The indirect relationships between these specific ideas and the specific fishing injuries of the Montrose case, however, are untested and speculative.

✓ Location

The proponent suggests targeting near-shore areas of the PV peninsula, but does not specify the size of the area over which algae restoration would occur. This would be in such close proximity to the areas of highest contamination that fish inhabiting kelp communities in these areas may still harbor unacceptably high levels of contamination from a human consumption standpoint.

2. Feasibility **Rating: Low**

✓ Technical issues:

Culturing and out-planting methodologies raise technical practicability issues, since there is no suggestion for other related habitat manipulation, a large number of species would be covered, and obtaining propagules from outside of the region would be recommended.

✓ Operational/Sustainability issues:

It is likely that these algal communities are highly dynamic in nature and that factors affecting their distribution are not completely understood. Thus, short-term reestablishment efforts might not lead to the long-term sustainability of the community, and thus the benefits to fishing, without periodic re-establishment efforts.

✓ Regulatory issues:

Obtaining permits to transplant aquatic plants that are native to the Monterey Bay area to the PV area might be extremely difficult or impossible due to concerns associated with introductions of exotic species.

3. Benefits to Injured Resource or Lost Services **Rating: Low**

✓ Duration:

It is likely that these algal communities are highly dynamic in nature and short-term reestablishment efforts might have little effect on the long-term sustainability of the community.

✓ Are benefits measurable?

Long term monitoring could identify community changes over time. However, due to the dynamic nature of kelp communities and the many factors that influence their abundance and distribution, it is not clear that changes could be definitively attributed to intervention such as this. Benefits to fishing would also be difficult to measure.

✓ What are the benefits in the absolute sense?

This concept suggests addressing the injuries of the Montrose case from an ecosystem perspective. In principal, the restoration of natural ecosystem processes would more likely be self-sustaining and have longer-term benefits that extend beyond the time-frame of the effort than would efforts that do not work to restore ecosystem processes. However, the degree to which changes may be attributed to this intervention and the timeframe over which increased abundance would occur is uncertain. The specific benefits to lost fishing opportunities (i.e., whether this effort would lead to higher abundances of less contaminated fish) would also be uncertain due to proximity to areas of high contamination.

4. Ecosystem Benefits **Rating: Low**

If successful, implementation would have impacts on multiple species. However, the period over which they would occur is uncertain, and the degree to which fishing resources would benefit is uncertain. While kelp forest habitats act as important habitat for a wide variety of marine species, it is not clear that out-planting of kelp alone would provide a sustained increase habitat.

Restore Algae (Kelp) on Palos Verdes Coast Total Tier 1 Rating: **Low**

Category: Habitat Manipulation - Wetlands/embayment **Number: 18**

Idea: **Protect and Restore Ormond Beach Wetlands**
Source: Earth Alert

Summary Description

This restoration idea, one of three submitted by Earth Alert, would entail replacing invasive exotic vegetation with native vegetation, and protecting nesting sites of endangered bird species in the Ormond Beach wetlands, Oxnard, Ventura County.

The effort is described as what could be an extension of a current undertaking by a local citizen group to protect, restore, and preserve the Ormond Beach wetlands. Specific actions suggested include: 1) Exotic plant removal (ice plant and arundo) and replacement with natives. 2) Posting the area to protect nesting endangered birds (least terns and western snowy plovers). 3) Daily patrol of the areas to restrict public use and protect against predatory animals. 4) Monitoring to evaluate success of floral changes and nesting success.

This area is portion of a larger area being acquired by California Coastal Conservancy and others for public use/preservation.

Rating Criteria

2. Nexus **Rating: Low**

The nature of this restoration would potentially improve the ecological function of the targeted area. The improvements are directed largely towards the protection and enhancement of seabird and shorebird species lacking a demonstrated injury related to the contaminants of the case. This idea as submitted, however, does not include specific actions to improve habitat for marine fish species targeted by recreational and substance anglers.

✓ Location

Ormond Beach wetlands are to the north of Point Dume on the Ventura County Coast.

2. Feasibility **Rating: Med**

✓ Technical Issues

Techniques proposed, namely signage, patrolling, removal of exotic plant species, planting with natives, are all common and conventional/ proven measures. The idea does not provide specifics, e.g. how vegetation would be removed, planted, how patrolling would be conducted; for this evaluation, it should be assumed that conventional methods and best practices would be employed.

✓ Operational/Sustainability Issues

Revegetation would likely be self-sustaining after a period of establishment and monitoring, but measures to protect bird nests would require ongoing long term efforts.

✓ Regulatory Issues

Relatively few regulatory / institutional barriers would be anticipated.

3. Benefits to Injured Resource or Lost Services **Rating: Low**

As stated above for Nexus factor, implementation would primarily benefit the natural resources of the Ormond Beach coastal environment, rather than the resources injured in the Montrose case. Thus benefits to injured resources and lost services associated with the Montrose case would be negligible, even if benefits to non-targeted resources were higher.

4. Ecosystem Benefits **Rating: Med**

If successful, implementation might have benefits to multiple species, however, few of those would be species associated with the Montrose case.

Protect and Restore Ormond Beach Wetlands Total Tier 1 Rating: **Low**

Category: Habitat Manipulation - Wetland/embayment **Number: 19**

Idea: **Clean up Consolidated Slip**
Source: California Regional Water Quality Control Board, Los Angeles Region

Summary Description

The Consolidated Slip sediments are contaminated with several pollutants of concern, including DDT, PCBs, PAHs, and several trace metals. Much of the DDT contamination may have originated from the Montrose Chemical Corporation's manufacturing site in Torrance, but other industrial dischargers and storm water runoff probably contributed to the contamination problems. LARWQCB conducted a sediment characterization study in late 2002 to provide a good estimate of the volume of contaminated sediments that require remediation. Once this information is available, LARWQCB will be able to evaluate alternatives and develop cost estimates for a cleanup effort. LARWQCB estimates that the cleanup could cost from $15 to 25 million, but the overall cost could be significantly higher or lower depending on the volume of contaminated sediments present and the actual remediation alternative selected. If LARWQCB is able to dredge and dispose of the contaminated sediments at a nearby location, the costs could be on the low side. LARWQCB also plans to pursue cost recovery from responsible parties that may have contributed to the existing sediment contamination problem.

Rating Criteria

1. **Nexus** **Rating: Low**

The area known as the "Consolidated Slip" is a portion of the Los Angeles Harbor that extends from the mouth of the Dominguez Channel south to but not extending beyond Pier 200B and 200Y.

The partial Consent Decree with Montrose Chemical Corporation et al specifies that, "No portion of the settlement amounts paid pursuant to this Decree shall be credited towards any future response costs relating to the Onshore Areas." The Consolidated Slip is specifically defined as being in the "Onshore Areas" for purposes of this Consent Decree. Since the idea proposed by the RWQCB, cleanup of contaminated sediments, falls within the definition of a response action under Superfund law, settlement amounts from this case cannot be used to fund the work proposed by the RWQCB.

This idea will therefore not be further evaluated.

2. **Feasibility** **Rating: Not rated**

3. **Benefits to Injured Resource or Lost Services** **Rating: Not rated**

4. **Ecosystem Benefits** **Rating: Not rated**

Clean up Consolidated Slip Total Tier 1 Rating: **Low**

(This idea cannot be further considered due to specific provisions of the Consent Decree prohibiting use of settlement funds for response actions in the Onshore Areas.)

Category: Habitat Manipulation - Wetlands/embayment **Number: 20**

Idea: **Contribute to Proposed Wilmington Leeward Bay Promenade, Marina & Wetlands Redevelopment**

Source: Wilmington Coalition for a Safe Environment

Summary Description

This concept would entail major redevelopment of a 100 acre area of land and the adjacent Consolidated Slip Marina, also known as Leeward Bay. The renovation would include numerous elements, including conversion of land currently used for automobile storage into a wetlands and wildlife preserve, creation of a new fishing lake, park, swimming lagoon, diving school, sailing and boating school, boat launch, slip for boat retail and charter boat fishing, boat repair shops, tackle shops, promenade walk, restaurants and open fish markets, retail stores, office building, marina, water reclamation facility, and LNG fuel power plant. The proponents of this idea suggest that the Port of LA and City of LA could re-allocate and re-zone existing land in the Los Angeles Harbor for greater Wilmington community urban redevelopment. The suggested redevelopment would occur in two phases. The idea submitted to MSRP includes all the components planned for phase I of the redevelopment and would involve approximately 50% of the total proposed area. The remainder of the land would be reserved for development in the second phase. The complete concept entails a large and diverse set of actions ranging from wetlands restoration to urban redevelopment efforts. For the purposes of evaluation the MSRP focuses on those components most closely related to natural resource restoration, i.e. options aimed at increasing wetlands habitat and creating new recreational fishing opportunities.

Rating Criteria

1. Nexus **Rating: Med**

The partial Consent Decree with Montrose Chemical Corporation et al specifies that, "No portion of the settlement amounts paid pursuant to this Decree shall be credited towards any future response costs relating to the Onshore Areas." The Consolidated Slip is in the "Onshore Areas" for purposes of this Consent Decree; however, in contrast to the other restoration idea that targets the Consolidated Slip area of L.A. Harbor (#19 above), the actions proposed by the Wilmington Coalition do not appear to constitute response actions (i.e. "cleanup") as defined in Superfund law. Thus, use of settlement amounts from the Montrose partial Consent Decree may be considered for at least some of the actions included in the restoration idea.

Creation or improvement of coastal wetlands habitats, if properly designed and carried out, might increase production of species of sport fish which utilize these habitats for critical life stages. Given the current land use of the site, it is likely that for practical purposes the design would emphasize creation of high inter-tidal habitat rather than shallow sub-tidal habitat; thus, such an effort would be directed more at broader natural habitat improvements rather than improvements to salt water fishing opportunities.

The creation of a 25-50 acre fishing lake might provide shore-based fishing opportunities if regularly stocked with fish. It is uncertain to what extent lake fishing opportunities, which are somewhat different from pier and boat fishing in ocean waters, would adequately substitute for lost salt water fishing opportunities.

✓ Location

The suggested site for redevelopment consists of land shoreward of Consolidated Slip as well as the marina portion of the Slip itself, and would thus be within the general SCB area affected by the case contaminants.

2. Feasibility — Rating: Low

✓ Technical Issues

Wetland restoration science and engineering has ample precedence in actual application, and conventional methods are typically employed for construction/ implementation. Conversion of heavily altered land would present greater technical challenges than restoration of more modestly altered land areas. Also, the specific design of the restoration would have a direct impact on its functional benefits for fish and fishing, (see Idea #3). Creation of an artificial lake for recreational fishing would, in theory, be technically feasible. Since current land use is heavily altered from its prior natural state, for both concepts, it is likely that further studies would be needed to determine whether there would be any significant physical, hydrological, or other technical obstacles.

✓ Operational/Sustainability Issues

Depending upon the specifics of the measures taken, light to moderate long term maintenance/operation might be required at wetlands restoration sites. They are generally designed to minimize ongoing operation and maintenance, and designed to be sustaining over a long period. The recreational fishing lake, however, would likely require intensive long term operational costs, especially if it is intended to function as a stocked reservoir for popular sports fish.

✓ Regulatory Issues

Commonly, wetlands restoration requires thorough environmental reviews and permitting, and various design/construction considerations might be identified that require resolution of competing interests (e.g. needs for adequate flood protection upon restoration of tidal influence). Implementation would require several steps in institutional approvals, including rezoning and re-allocation of land and land uses.

3. Benefits to Injured Resource or Lost Services — Rating: Med

✓ Duration

Duration would be long term but would entail ongoing operation and maintenance, especially for the artificial fishing lake.

✓ Are benefits measurable?

While some commercially or recreationally important species may rely upon coastal wetland habitats for foraging, reproduction, and spawning, it would be difficult to predict, and perhaps harder to evaluate in quantitative terms, how much of an increase in production in the populations of sport fishes in the coastal areas of Southern California would result from the proposed wetlands creation idea. One could, however, measure the amount of fishing use and differences in fishing quality that an artificial fishing lake provides to anglers.

✓ What are the benefits in an absolute sense?

Implementation would likely provide benefits to some species of fish that require wetlands/estuaries as a nursery habitat; however, given the likelihood that it would be designed as a high inter-tidal wildlife preserve, it would likely provide relatively greater benefits to birds and other wildlife. Benefits to recreational fishing would also depend upon whether the artificial lake provided a comparable fishing experience to shore based salt water fishing.

4. Ecosystem Benefits **Rating: High**

The wetlands portion of this idea might provide ecological benefits to numerous natural resources. The fishing lake would principally provide fishing services, although it would likely also provide benefits to birds and other natural resources.

Contribute to Proposed Wilmington Leeward Bay Promenade, Marina & Wetlands Redevelopment

Total Tier 1 Rating: **Med**

Category: Public Awareness **Number: 21**

Idea: **White Croaker Commercial Market Certification Program**
Source: Fish Technical Workshop

Summary Description

This restoration idea was raised as a possible way to address the injury to the commercial catch of white croaker for sale in regional fish markets. While the State fish consumption advisories cover several species and locations, white croaker is the only species of fish for which there is a commercial catch ban in place, covering a specific location in proximity to the most heavily contaminated sediments. Across the entire Southern California Bight, not all white croakers are heavily contaminated with DDTs and PCBs; white croakers caught outside of the areas of high sediment contamination are generally low in these contaminants. Currently it is difficult for commercial anglers to wholesale white croaker catches regardless of where the fish were caught, because the ultimate retail buyers have no way of knowing where the fish were caught and whether they are heavily contaminated. Under this idea, white croaker that are commercially harvested from locations known to be low in contamination and that are wholesome for consumption would be certified to that effect, and buyers would be able to make their purchase with confidence in the product.

Rating Criteria

1. Nexus **Rating: High**

This idea has a nexus to the MSRP case because the commercial fishing ban for white croaker was a *per se* injury in the Montrose case pursuant to the Department of Interior's natural resource damage assessment regulations (43 CFR Part 11.62).

✓ Location

The certification effort would be instituted within the Los Angeles metropolitan region and white croaker would presumably come from less contaminated areas of the SCB and areas adjacent to it, e.g. Ventura.

2. Feasibility **Rating: Low**

✓ Technical issues:

There would be no technical obstacles to implementing such n effort, assuming it would consist of an inspection and certification program to ensure those white croakers harvested in less contaminated waters are appropriately labeled for retail sale. Whether such an effort would in fact translate into an improvement in ability to market white croaker to the public is less certain.

✓ Operational/Sustainability issues:

Implementation would require development and long term maintenance of an infrastructure and staff for operations, to ensure that the fish sold in markets were in fact correctly identified. Because the certification would amount to an official assurance of the quality of the fish for consumption, it would be necessary to institute a verifiable system, e.g. have paid observers on board commercial boats harvesting white croaker and a chain of custody system so that the integrity of the certification was intact. These implementation details could make such a system cost prohibitive, i.e. the cost of the certification process if incorporated into the wholesale price of the fish could drive the retail cost of the fish too high to be marketable. If alternatively the entire cost of the certification process were borne by the MSRP, it might not be possible to sustain for an appreciable period.

✓ Regulatory issues:

No particular regulatory obstacles are obvious.

3. Benefits to Injured Resource or Lost Services **Rating: Med**

✓ Duration:

Duration would be as long term as the timeframe in which such an inspection/certification program was operated.

✓ Are benefits measurable?

Benefits to consumers, commercial fishermen, and fish markets could be measured in terms of changes in fish sales.

✓ What are the benefits in the absolute sense?

Implementation would principally benefit the commercial angling community impacted by the commercial catch ban for white croaker by restoring their ability to market white croaker.

4. Ecosystem Benefits **Rating: Low**

Implementation would have no benefits to any fish or fish habitat, but would provide the consumer with greater confidence in the fish they consume, and would also provide the opportunity for commercial anglers to continue to fish for white croaker in "clean" areas.

White Croaker Commercial Market Certification Program Total Tier 1 Rating: **Low**